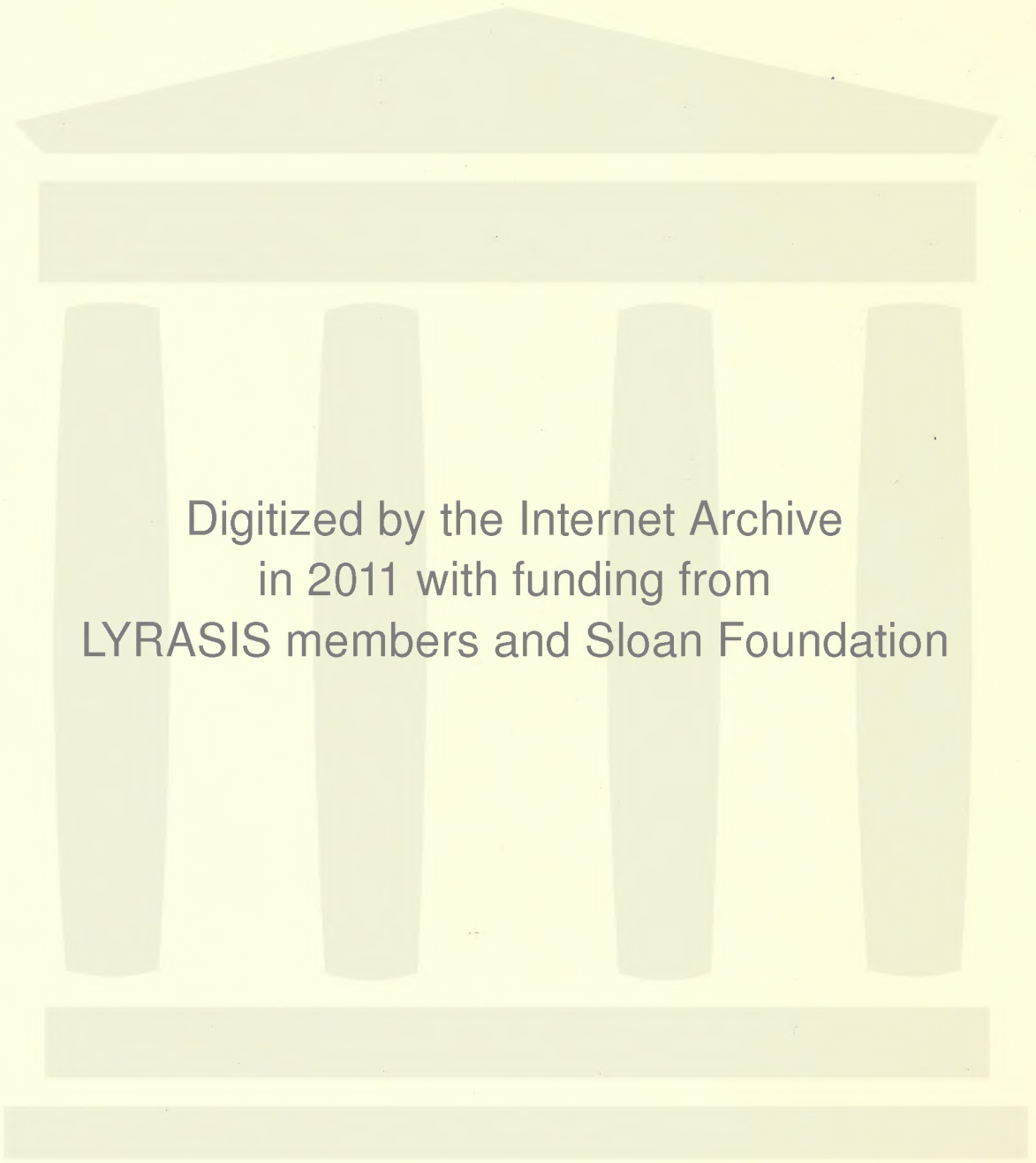

SOUTHERN GOOD ROADS

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Selecting the Roads to Be Improved

By HON. FAIRFAX HARRISON

President Southern Railway Company

In the early days of the good roads movement, a meeting such as this in the South would properly have devoted its time largely to emphasizing the advantages of good roads, but, while educational campaigns to teach the value of good roads are no longer needed in the South the holding of the American Road Congress in Atlanta will tend to stimulate the good roads movement in all of the Southern States. As soon as the present business depression, growing out of the effect of the European war on the market for cotton, has passed away, as it surely will, and when the onward progress of the South has been resumed, one of the ways in which it will be manifested will be in greater activity in road building.

When road improvement is taken up in any community, it is important that it be started right, and I shall venture to speak to you briefly on what, I think, is one of the most important matters that must be decided before actual work can be commenced. That is: the selection of the roads to be improved.

It is almost invariably true that the community embarking on a policy of highway improvement is not financially able to rebuild all of its roads at one time. Those in charge of its road policy must decide which of the roads shall be improved at once and which shall be left for the future. The answer must be found in the peculiar needs of each community.

There is a glamour about the mere suggestion of a great through highway traversing several States, connecting widely separated cities and traveled by tourists from distant parts of the country. The very history of such roads is fascinating, as, for example, that of the Cumberland road or the National Highway which pierced the West in the early days of the XIXth century. Under modern conditions such a road may benefit the owners of touring cars, and its use by them may scatter some few dollars in the different communities which it traverses, but it will benefit relatively few farmers—only those who live along its line. In a community where the principal industry is conducting hotels for tourists, the improvement of roads with special reference to attracting automobile travel may be desirable, but, generally speaking, I doubt whether the best use that can be made of a limited road fund will be in the construction of a through highway of this kind.

The statesman of road building must consider what permanent value the road may serve in developing a

An address delivered at the American Road Congress, Atlanta, Ga., November 9-14, 1914

A good country highway is helpful, directly or indirectly, to all those who live in town as well as those who live in the country, but it is primarily beneficial to the farmer. It is his highway to market. He and his family must use it in all of the social intercourse of county, and under our conditions in the South this consideration points inevitably to the farmer as the class most to be considered in road planning.

HON. FAIRFAX HARRISON

the neighborhood and in church and school attendance. It is over the county road that the rural mail carrier brings to the farmer his letters and the newspapers which keep him in touch with the events of the world. While it is not generally appreciated, because few farmers keep books in which they take account of their

own time and that of their own teams as well as of their hired men, statistics prepared by the United States Department of Agriculture show that the cost of hauling farm products to a shipping station is a very large percentage of the total cost of their carriage to their final markets and is out of all proportion to the charges made for their transportation by rail or water. An improved road reduces this cost and the effect of bringing outlying farms nearer to the shipping point by reducing the time required for hauling, and it tends to advance the value of each farm that it passes.

On account of the great interest of the farmer in good roads, I believe that those responsible for the road policy of any community should endeavor to expand such funds as may be available so that the largest possible number of farmers may be benefitted and that this may be accomplished by improving first the roads that radiate from a market town or shipping station.

If the amount of money available is quite small, it may be necessary to limit expenditures, for a time, to a single road, but where sufficient money can be obtained, the benefits will be more widely distributed if the money can be expended on several, or all, of the important roads radiating from the town. While it is possible that, on a given road, the greatest benefits will be obtained by spending the money that may be available for it in improving some particularly bad part of the road at a distance from the town, the general policy, I believe, should be the improvement, first, of that part of the road leading out from the town. If the policy of dividing the money available among several roads rather than concentrating it on a single road shall be adopted, it may not be practicable to improve an extended mileage on any one of the roads. This will, however, permit the largest number of people to share in the benefits, for the farmer driving into town from any direction, even though he may live beyond the end of the good road, will have an improved highway for at least part of his haul to town. Then, as additional funds become available, from year to year, each of these roads may be extended further into the country, until, in time, they form connections with similar radiating roads constructed by other communities, and the entire locality is provided with a network of good roads.

While a system of radiating roads of this kind will benefit the farmer primarily, it will also be helpful to the town. In an agricultural community, without substantial manufacturing enterprises, the town is practically supported by the trade of the farmers of the surrounding country. A good road, to the degree that it may enable a farmer to market to better advantage, increases his purchasing power to the benefit of the merchants in the town where he may trade. Improved highways radiating from a town widen the area from within which the farmer may profitably market his products and buy his supplies in the town. Good roads in any community are also an important factor in attracting farm settlers, who will bring increased trade to the town.

But we have in the south many purely industrial towns and cities which may seem not to depend largely on any country—towns in which the trade of the surrounding farmers is relatively of little importance in the total volume of their business. Such towns are nevertheless interested in developing systems of radiating roads such as I have suggested. Even in the largest city, a certain element of the population is concerned, directly or indirectly, in the trade of the surrounding country and every resident is almost as much interested in building up nearby sources of cheap and fresh supplies for his produce market as he is in the maintenance of good schools. With bad roads that are almost impassable during certain seasons of the year the area within which milk, and perishable articles generally, can be successfully produced for the city market, is restricted. With improved roads this area is greatly extended. A system of good roads out of a city may mean, for a large part of the population, the difference between fresh food and the cold storage warehouse.

I may emphasize the point I am endeavoring to make by citing the concrete example of Mecklenburg county, North Carolina. That county was one of the first in the state systematically to take up the matter of road improvement. The United Census reports show that in the twenty years from 1890 to 1910, the population of Mecklenburg county increased fifty-seven per cent. as compared with an increase of but thirty-six per cent for the state of North Carolina as a whole, and the population of Charlotte, the county seat, increased, in the same period, one hundred and ninety-four per cent, a more rapid rate of growth than was shown by any other incorporated place of relatively the same size in the state. The value of all farm property in Mecklenburg county in 1910, as reported by the Census Bureau, was greater than in any other county in the state with the exception of but one county with one and three-fourth times the area of Mecklenburg county, and the value of farm lands, per acre, was greater than in any other county in the state with a single exception. Other factors have contributed to the progres of Mecklenburg county, but we may fairly attribute part of its growth in population and wealth to its enlightened road policy.

Other southern counties might be cited showing similar progress following the construction of improved country highways radiating from a central market town, and I believe that, wherever this policy may be adopted, its wisdom will be demonstrated by results.

Praise for the Alabama State Highway Commission.

The following well-deserved tribute to the efficiency and usefulness of the Alabama State Highway Commission, of which Hon. John Craft, of Mobile, is the head, is from the current issue of Engineering & Contracting:

"The commission has successfully supervised work accomplished by different methods of construction; by day labor, by convict labor, and by contract. This fact demonstrates the flexibility and efficiency of a state highway commission in supervising work in a sparsely settled state, and the fact is also demonstrated that state supervision and control is not dependent on the building up of a large force of employes paid by the state. However, it is probable that future developments will indicate the need of absolute state control. But in the early stages of the development of state supervision in the south the authority vested in the Alabama commission apepars to fit conditions.

"The most important work accomplished by the commission, however, is in the unifying of the various types of road construction used throughout the state and promoting efficiency in local county organizations."

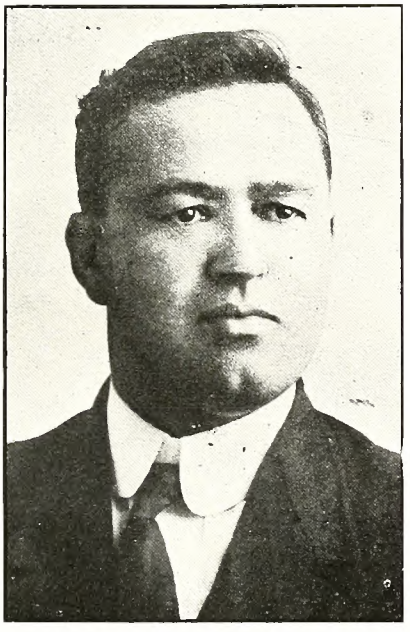
The Good Roads Committee of the Cleburne, Texas, Commercial Club has just raised $783 to be used in work on the road from Cleburne to the new bridge across the Brazos river which is part of the Meridian Highway. Numbers of farmers in addition to cash contributions, have been devoting some of their time to road working. The committee is still active in securing subscriptions for road improvements.

Progress on Central Highway in Western North Carolina

By N. BUCKNER, Asheville, N. C.

THE MOST difficult portion of the Central Highway across the state of North Carolina is now being rapidly constructed. Fifty men, fifteen teams, working with modern road building machinery which includes a Marion steam shovel, wheel and drag scrapes, under the supervision of government engineers, expect to have the link of road from Old Fort, 1437 feet altitude, to Ridgecrest in the Swannanoa Gap 2800 feet above sea level, ready for automobile travel during the summer of 1915. The distance from Old Fort to Ridgecrest is only about seven miles air line, but about sixteen miles of road will have to be built to connect these two points.

The route surveyed by the government engineers gives an average grade of about 4 per cent, which will afford easy travel for all classes from the millionaire down to the "hobo." The road winds about the sides

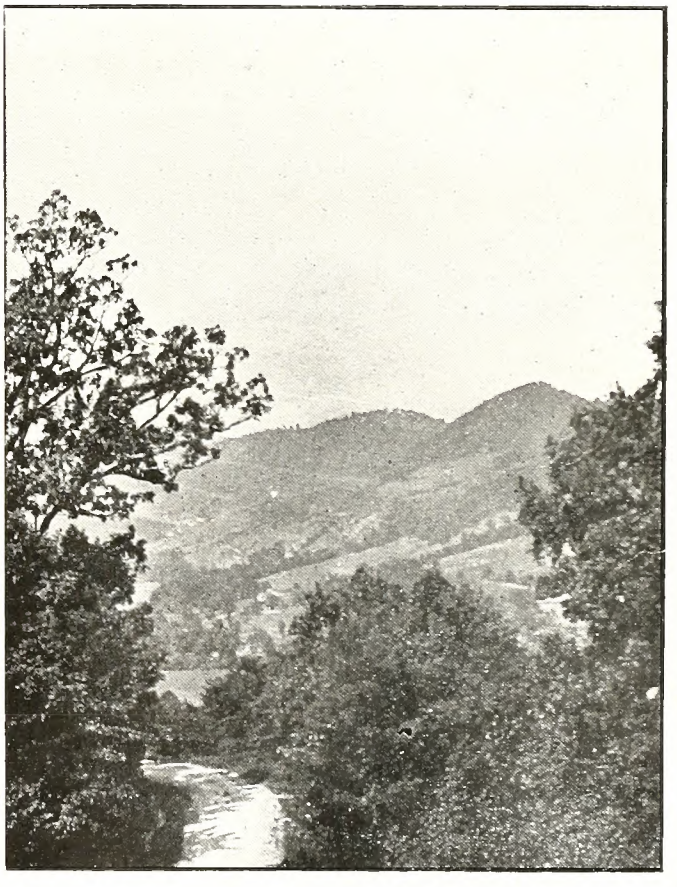


N. BUCKNER

of the mountains and across the coves in many graceful loops and curves, at times skirting the steep mountain sides and looking down hundreds of feet to the tracks of the Southern Railway below, and to the famous Andrews Memorial Fountain, which sends its several streams of water a hundred feet into the air to break into silvery spray with the emerald green of the mountains as a background.

The contract for the construction of this portion of the Central Highway was let to J. R. Gibson, of Knoxville, Tenn. The width of the road is 18 feet, shoulder to shoulder with 9 inch crown, with underdrains of stone and heavy metal pipe. Work was begun on August 15th and more than two miles of this road have already been completed. In the distance from Old Fort to Ridgecrest and over the Swannanoa tunnel, which is more than 1800 feet in length, through which passes the Southern Railway, is a perpendicular ascent of 1363 feet. Spanning the streams on the mountain are four steel bridges with concrete abutments being erected by the authorities of McDowell county at a cost of a little more than $15,000.

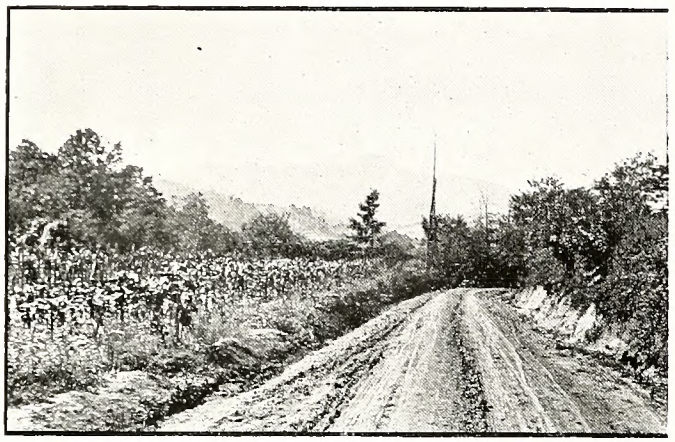
The funds to build this road were derived by a bond issue of Old Fort township amounting to $20,000, which was passed with but two or three dissenting votes, $10,000 from the post roads fund of the U. S. Government and a public subscription in that district of about $5,000. It is expected that this road will be open for automobile traffic some time during the summer of 1915, which will enable tourists to travel from Morehead City over the Central Highway, passing through Newbern, Goldsboro, Raleigh, Durham, Greensboro, Lexington, Salisbury, Statesville, Hickory, Morganton, Old Fort, Ridgecrest and into Asheville, thence to the Tennessee State line near Mt. Sterling and Paint Rock.



Central Highway through Chunn's Cove between Asheville and Black Mountain

A force of state convicts is at work on the Madison county link of the Central Highway working east from the state line at Paint Rock, under the general supervision of Dr. Joseph Hyde Pratt, state geologist, of Chapel Hill, N. C. Nearly five miles of the section of the road from the Tennessee state line toward Hot Springs has already been completed and satisfactory progress is being made. That part of the Central Highway in Buncombe county from Asheville to the Madison county line, while passable for motor cars, is being greatly improved by the progressive commissioners of Buncombe county. The northern prong of the Central

Highway by way of Canton, Waynesville and Mt. Sterling to Newport, Tennessee, is in exeellent eondition for automobiles with exception of about three miles at Mt. Sterling on the Tennessee side, and the Tennessee authorities are organizing a movement to put this portion of the road in good condition before the 1915 summer season. The Central Highway from the Tennessee-North Carolina state line across the state as far as Durham has been designated as the route of the South-



A section of the Asheville—Spartanburg Highway on Saluda Mountain

ern National Highway from Washington to San Diego, and logged by W. O. L. Westgard of the A. A. A. in 1913

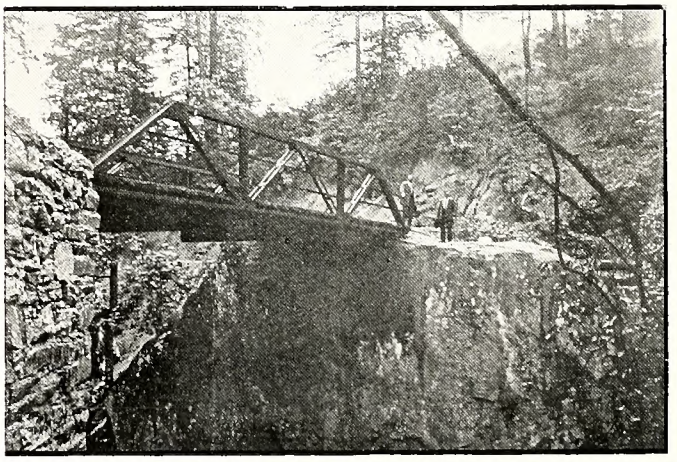
The Asheville-Spartanburg Highway by way of Hendersonville, Saluda and Tuxedo, down the famous Saluda Mountain to Spartanburg, has all been eompleted, with a splendid roadway of easy grade, with the exception of about one mile in Henderson county, on which a large force of men is now at work and will complete the same within the next sixty or ninety days. This road has been used during the past summer for tourists eoming to Asheville, as well as the Asheville-Greenville Highway across Paris Mountain, whieh up to the past year was the only inlet for automobile tourists into Asheville.

There are now three motor highways into Asheville from the New York-Atlanta Highway: From Charlotte through Chimney Rock section and Hickory Nut Gap into Asheville; from Spartanburg, S. C., aeross Saluda Mountain into Asheville, and from Greenville, S. C., across Paris Mountain into Asheville.

Making a perpendicular aseent of 465 feet, and to cover a distance of half a mile as the crow flies, the Hickory Nut Gap Road on the Buncombe county side of the mountain, 15 miles from Asheville, winds about the face of the mountain and eovers an actual distance of a mile and a half in eight big curves or loops in order to attain the gap of the mountain at 2850 feet above sea level, and conquering the most difficult portion of the now well known and famous Asheville-Charlotte highway through Hickory Nut Gap, via Rutherfordton and Shelby from Asheville to Charlotte, a total distance of 120 miles, reducing the former motor distance by Greenville, S. C., of 55 miles and by Spartanburg, S. C., of forty miles.

From the foot of the mountain near the old McBrayer place over the new route to the Buncombe-Henderson county line is two and a half miles with a perpendicular ascent of 590 feet, but it is within the last mile and a half, as first mentioned, that the real difficulty presented itself to the engineer, Chas. H. Neal, road engineer of Buncombe county, and tested his fine road engineering mettle. The radius of the eight big loops range from 50 to 100 feet and in most instanees are so loeated as to afford the most wonderful views of beautiful upper Swannanoa valley and the Craggy Mountains. The roadbed is 24 feet wide with a 9 inch crown, with the eurves or loops all sloped toward the inside for proper drainage and traffic eomfort. This streteh of two and a half miles was let by eontraet by the Buncombe County Commissioners to Chas. H. Alexander, who has been working steadily a foree of fifty to seventy men and 20 to 30 teams. The priee paid was 75 cents for roek, 35 eents for loose roek and 22 cents for dirt. The estimated eost will be about $5000 a mile including stone work in culverts and under drain pipe. The stone work is done at $3.50 a yard. The pipe is furnished by the county and hauled and laid by the contraetor for 20 cents a foot.

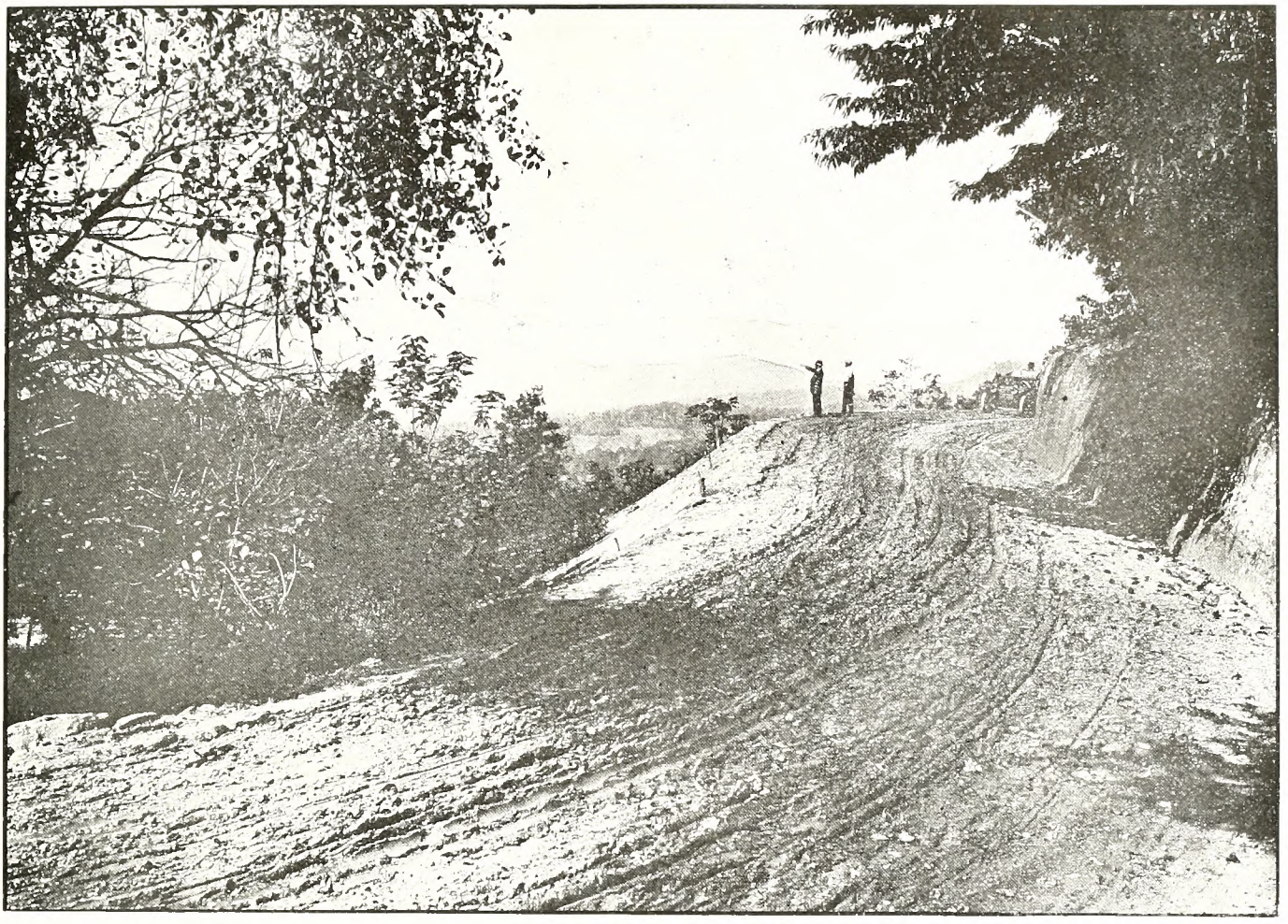
On the east or south side of Hickory Nut Gap Mountain the state convicts are making good progress towards the county line in the Gap at the top of the mountain and have already completed about four of the seven miles from the Rutherford county line near Bat Cave to the Buncombe-Henderson county line in the Gap. With the completion of this link in Henderson county, the road from Asheville to Charlotte will become one of the most popular motor roads in the country, since the mountain seenery through the Broad River Canyon and Chimney Rock section, and through Hickory Nut Gap, is considered unequaled in grandeur, perhaps, by any seenery East or West. The Appalachian Falls near the famous Chimney Rock leaps over the solid granite side of the mountain a distanee of 969 feet in its first fall, and from that point is broken in a series of falls and eascades in its downward rush to Broad River in the valley. This road taps the great New York-Atlanta Highway at Charlotte, and the loop trip from Charlotte through this wonderful canyon and Gap to Asheville, and back to the New York-Atlanta highway via Hendersonville at either



Iron bridge across Pacolet river, on the Saluda Mountain, Asheville—Spartanburg Highway. One end rests on a natural stone abutment that is 26 feet above the water

Spartanburg or Greenville will prove wonderfully popular and attractive for motorists from New York, Philadelphia, Baltimore, Washington and other points east, who tour South for the balmy climate of winter, or the cool comfortable climate of the mountains at 2500 feet altitude in the summer.

Haw River township of Chatham county, N. C., has voted $20,000 of bonds and with the funds resulting from their sale will construct 25 miles of sand clay roads.



Newly graded road on Hickory Nut Gap Mountain, Asheville—Charlotte Highway

Congressman Borland on the Classification of Highways.

The following is the opinion of Congressman W. P. Borland of Missouri on the good roads question:

"It is easy enough to shout 'good roads' and to convey the adroit impression on the minds of every hill farmer that he will have the road pass his place; but when we get down to practical business we will find that only a very limited percentage can ever be improved to a high condition and that these roads must be the ones which will serve the greatest number of people. It is very easy to defeat the whole plan by appeals to the prejudices of those voters who would be led to believe that they will get no direct benefit from the roads. It is possible even to inflame them to high indignation against the people whom they think will be benefitted.

"It will be necessary in my judgment to classify all existing highways into at least three classifications. The first is the great cross-state or inter-state highways reaching into every county in the state and opening every section to the benefits of the improved land values, freer social intercourse, and higher intellectual life. The second is the main feeders or great country roads; and third, the by-roads, local roads or lanes. These various classes of roads should be built, improved and maintained with a view to the amount of traffic that they can bear and must bear. The first class should be of the most permanent and scientific construction. The second class could be of less expensive nature and would need less maintenance. The third class could be improved only to the extent that the community required. The expense of building and maintaining these roads should be distributed upon the same basis. The roads of the first class should be supported by the taxing power of a large area of country including at least the entire state, because the wealth gathered in the cities ought to contribute to them. The second class of roads should also have a wide taxing power at least co-extensive with the county and possibly with a group of counties or with some state aid. This would leave the small road district or local community only the burden of the smaller or purely turn and argue about the question we must eventually come to some scientific solution of the problem. I realize that when we begin to talk about real road improvement political difficulties of all kinds are encountered. What the people will demand in the next few years in this country is good roads and not politics."

Good roads enthusiasm is running high throughout the mountain towns, of Kentucky and all seem especially interested in the proposed "Boone Way" and feel confident that congress will do its share toward helping the Kentucky Good Roads association in building the Boone way and make it a national highway. Robert E. Woods, director general of the Kentucky Highway association, has been in the mountain towns making speeches in behalf of good roads and the Boone way.

The city of Corpus Christi, Tex., votes this month on a $100,000 bond issue for streets.

The Rose Lined Boulevards of Los Angeles County

By MORRIS M. RATHBUN, Los Angeles, Cal.

BEAUTIFICATION of roadsides after a fine highway has been constructed is only a natural step, but it is a difficult one to take. Usually it is not easy to raise the funds necessary to build the road, without considering decorating it. While the good roads movement has progressed wonderfully and today is more general than ever before, there remains so much building to do that in most instances it is a far cry to beautifying after a stretch of highway is finished.

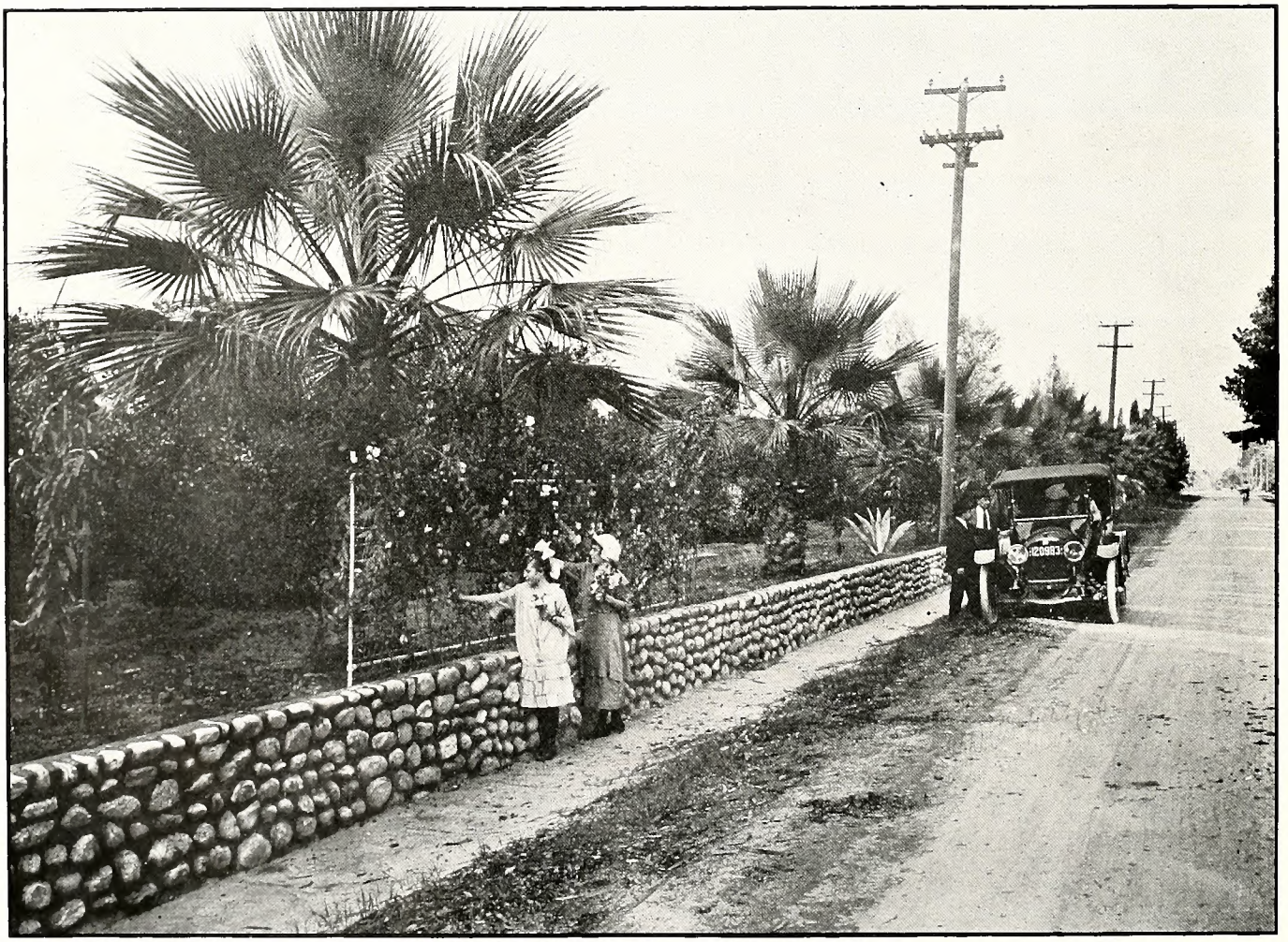
One of the initial moves in this direction has been taken by the county of Los Angeles, California, where two hundred miles of boulevards have been lined with trellises over which are growing in profusion some thirty varieties of climbing roses. Under the direction of the county forestry department not only have these rose lanes been created, but palms, eucalipti, poppies, petunias and geraniums have been planted. When these decorative effects have reached their full flower the traveller along the county highways will enjoy the fragrance and gorgeous coloring that might be expected only in a garden.

The trellises are of iron, twenty feet long and five feet high, wired so that the roses may have ample support. Five bushes are planted to a trellis, care being taken to adapt the different varieties to the changes of soil encountered and to make most effective the combinations of coloring in the flowers. There are ninety of these trellises to the mile.

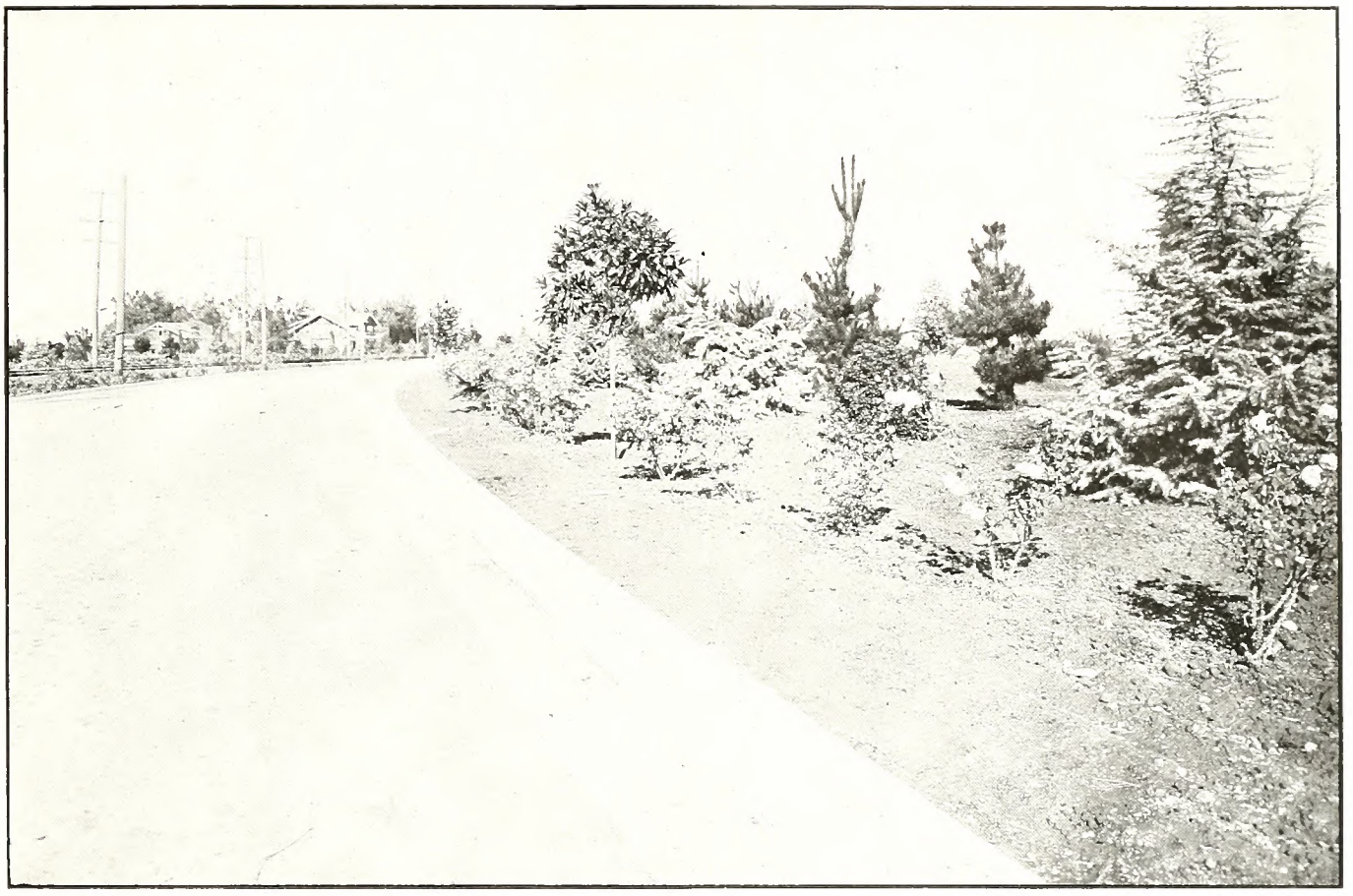
Along the sandy stretches where the soil will not grow roses without irrigation palms have been set.

Care also has been taken to place the roses where they will be most effective. Already there are many miles of county roads lined with orange, lemon and walnut groves, which are bordered with rose hedges, wild flowers or similar ornamental floral effects that add materially to the view. Although this sort of road decoration is done by individual land owners there seems to be general co-operation in maintaining continuity of design.

Through its forestry department the county has for years been planting trees along the roads, though never before has there been put into effect wholesale flower planting. One of the finest boulevards several years ago was lined with double rows of roses, backed by palms, for eighteen miles in a single stretch. This was done by individuals and the flowers are on private



Showing type of rose trellis erected along more than 200 miles of Los Angeles county, Cal., highways



Roses and fir trees line this road for 18 miles. Suburban railroad passes between twin roads. This picture was taken in December and shows one of hundreds of similar scenes around Los Angeles, Cal.

property, which condition, however, does not rob the passer by of the pleasure of his journey. Along this piece of highly developed roadway are 50,000 rose bushes, now from four to six feet high, embracing fifty varieties.

The many beautiful effects developed along boulevards passing through cities and towns suggested the idea of miles of rose lanes in the country. An organization of 175 leading citizens of the county known as the 1915 General Committee enlarged upon the pretentious plan and brought it to a successful conclusion.

The committee was brought together to beautify Los Angeles city and county and to provide entertainment for the tens of thousands of exposition visitors who are expected in 1915. Funds for the work of the committee were provided by direct taxation, nearly half a million dollars being included in the tax budget. The road decorative part of the committee's work was prosecuted by the county forestry department. Seventy-five thousand dollars was allowed for beautifying the county, most of which has gone toward converting the highways into wide flung gardens.

Some criticism was heard over the magnitude of the floral scheme, but this died away as results became apparent. It was pointed out that the trellises will last for many years, that each succeeding season will bring greater masses of flowers and that so elaborate an effect will add materially to the fame of the county's good roads system.

While only sections favored by climate as is this part of California may adopt similar floral decorative features for highways, it is expected that the influence of this step forward will be felt in many parts of the country, and will prove a precedent to communities ambitious to make their highways beautiful as well as useful.

A new mark has been set through the work done in preparing for California's exposition year. Good roads enthusiasts now are hopeful that all of the four hundred and four miles of paved boulevards in the county will be flower lined, so that the autoist, the equestrian, the cyclist or pedestrian may radiate from Los Angeles to the beach resorts, Pasadena, the canyons and other points of interest without leaving the flower zone for a moment.

The Newport Culvert Company.

A deal of considerable magnitude was put through during the closing days of the year when Mr. W. H. D. Wheat and associates, purchased the Newport, Ky., branch of Harry Brothers, the famous makers of corrugated iron culverts. The new company is to be known as the Newport Culvert Company and takes over a well established trade of great magnitude. The name and fame of Harry Brothers is well established in the Southern field and their successor, the Newport Culvert Co., should be able to hold and enlarge the big trade built up by the old company.

Southern Good Roads wishes Mr. Wheat and his associates well.

Chattanooga, Tenn., contemplates the issuance of $150,000 of bonds for street improvement. The plan is for the city to pay one third of the cost of street improvement, while the property-owners pay the remainder, making a total expenditure of $450,000.

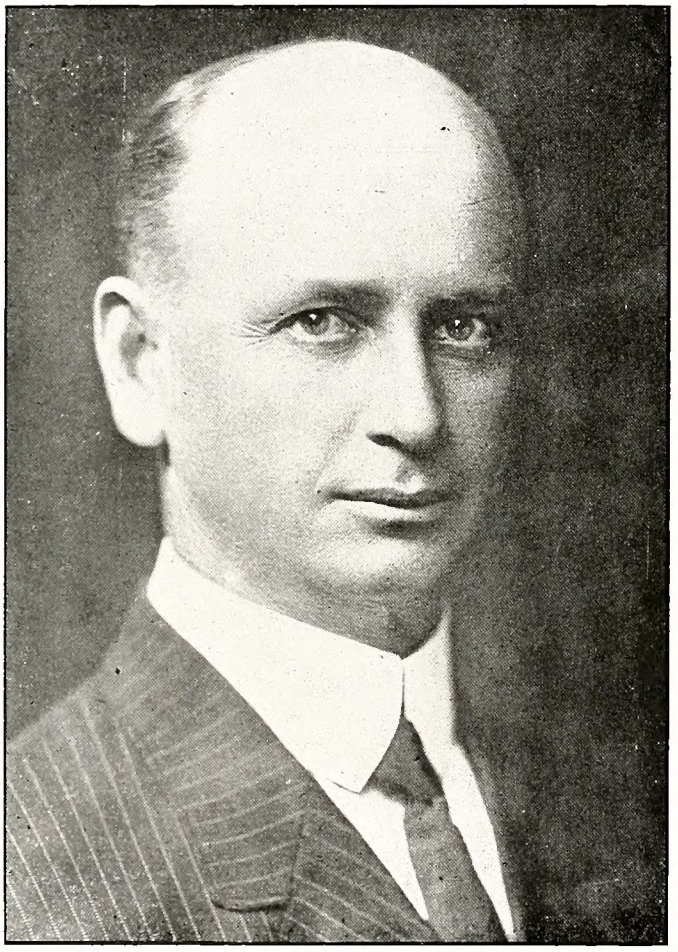
Anson county, N. C., will build six miles of sand clay road from Wadesboro to Morven township line.

Engineering and Supervision of Roads

By W. S. KELLER

State Highway Engineer of Alabama

THIS QUESTION confronts every commission that has the building of good roads, and it would appear to the business man that the wisdom of having an engineer supervise the expenditure of large sums of money on highway construction, would not be questioned any more than a railroad company would question the wisdom of employing an engineer to locate and supervise the construction of a railroad.



W. S. KELLER

We may, therefore, for discussion divide this subject under two general heads:

Is engineering supervision of road construction necessary?

Why is an engineer better fitted to supervise road construction than a practical road builder who is not an engineer?

The average county commissioner has had no experience whatever with an engineer. He has, however, carried the rear end of a chain for the county surveyor, and, in unison with his colleague, the front chainman, cried "stick, stuck." He has a very exalted opinion of this man with the Jacob staff and compass who is able to follow land lines for a distance of three or four miles a day. Far be it from me to belittle the county surveyor. I would instead erect a monument to him as a martyr who receives a pittance for his labor and a "cussing" for his pains. We point with pride to the fact that the "Father of his Country" was a land surveyor, but we seriously doubt if he was competent to locate, and properly supervise the construction of roads.

Engineering supervision of road construction is absolutely necessary and this statement is proven every day, positively and negatively, in this state of Georgia. A layman riding over the roads of Georgia can tell at a glance a road that has been located and built under the direction of a nengineer. When he rides over a road that has been constructed along the old trail, located by the Indians and early settlers, without any regard whatever for grades and very little for drainage; he sees the hand marks of the commissioner, who saves his county the salary of an engineer, and spends it thrice over in useless work and expensive maintenance.

Despite the fact that a majority of commissioners or supervisors have had no training whatever in road building, they will concede to no one that they are not as well qualified to direct road work as any engineer they can employ. They will often admit that an engineer should locate and stake off a road, but they think his duty ends there. It is just as necessary that an engineer supervise construction work as it is that he should locate the road. How many commissioners in the hearing of my voice can tell me how much it costs to move a yard of earth or how much it costs to install pipe of various makes—how much per cubic yard their concrete culverts are costing them? You may say we know how much per mile our roads are costing, why should we bother to know the unit cost? Why, my friends, does a merchant keep the unit cost of his wares? Because he desires to buy from the man who sells the cheapest. So, a county should know if its roads are costing more than they should.

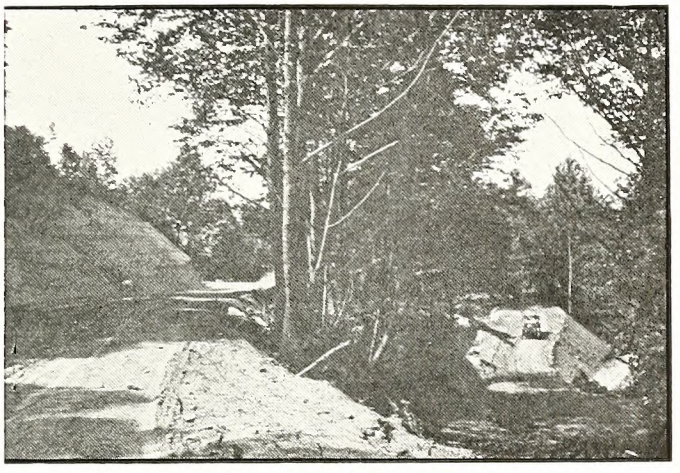
The commissioners of a certain county in Alabama claimed that they were building roads as cheap or cheaper than any contractor could do the work. They had an engineer estimate the cubic yardage of earth moved for a certain period of time and to their surprise it was costing 37½ cents per cubic yard when the average contract price in Alabama for three years had been 23 cents per cubic yard. Authorities should know whether they are getting value received for their money, and an official who overlooks such a vital question, is not true to the trust placed in him by the people.

Many counties are imposed on in the purchase of material and supplies and are actually paying more for such in large quantities than individuals have to pay for the same in small amounts. This is usually attributed to either carelessness, politics, or a false idea some of the commissioners have as to their duty. I believe the duty of commissioners, in so far as road building is concerned (and it can equally as well be applied to other public matters) is to purchase with as much care and secure just as low prices as they would if buying for themselves as individuals, regardless of whether the goods purchased come from local or foreign merchants; of course, giving always the preference to local mer-

An address delivered at the American Road Congress, Atlanta, Ga., November 9-14, 1914.

chants, if their wares are as good and prices as low as those of outsiders. It is not the duty of road authorities to conduct county affairs so as to make money for individuals or to give jobs to political henchmen. If a competent man cannot be found within the borders of a county fit by experience for a position such as foreman, it is right and proper that a competent man should be secured from elsewhere.

The remedy for these ills is, unquestionably, to have some one in charge of road building qualified by education and training and free from political influences,



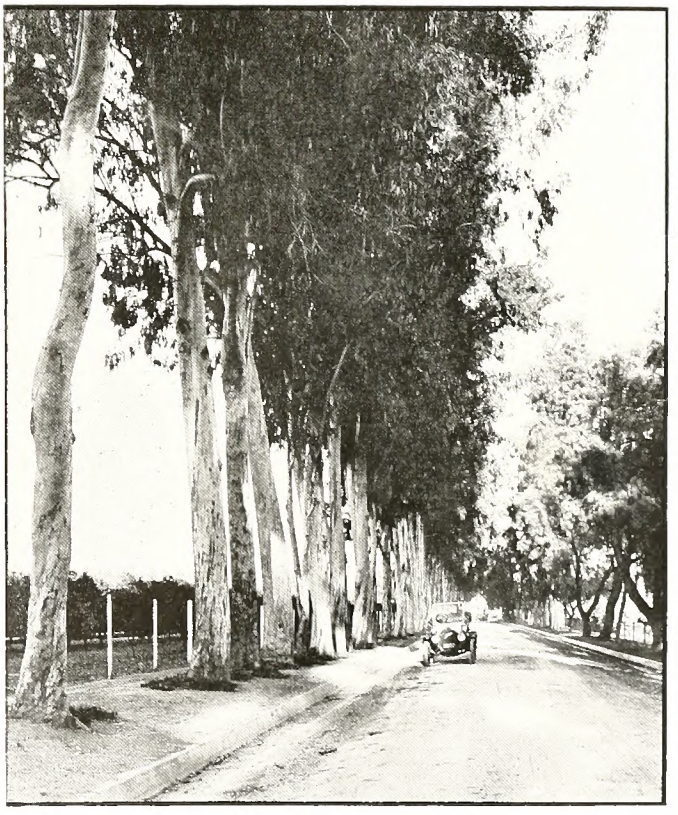
A big loop on Hickory Nut Gap Mountain, Asheville—Charlotte Highway. Old road shown at right of picture

who can be held responsible for results. Very few counties have commissioners or supervisors who devote all of their time and attention to their office, and it is self-evident that an engineer trained in road building will get better results than can any set of men who give only a few days in the year to their public office.

As to the second division of this subject, "Why an engineer is better fitted to supervise the construction of roads than a practical road builder who is not an engineer." First, an engineer is indispensable, even though you have a splendid layman to supervise the work. A large percentage of all roads to be constructed require relocation, profiles made, grades established and if the work is to be contracted, the road must be cross-sectioned and the yardage of excavation and embankment calculated and made to balance as near as possible. Such work, a layman cannot do. Who is better fitted to supervise the construction of any job than the man who plans and specifies the work? The road supervisor is usually uneducated and it is practically impossible for him to correctly account for the expenditure of large sums of money and equally as impossible for him to keep cost account of his work.

This condition is usually brought about by a disposition on the part of the Board of Supervisors or Commissioners to economize. Unfortunately, many county commissioners can see only the engineer's salary to be paid twelve times a year and the inevitable result that there will be quite a decrease in the number of days they can legitimately demand pay for laying off and superintending the building or repair of roads in their respective districts. In other words, the engineer is a usurper, taking away the salary of those guardians of the people's right who are so anxious to save money for the people that they save $200 per month engineer's salary and spend $500 per month in doing it. So long as we elect officials because of their popularity rather than fitness, and pay them a mere pittance for their services, we may expect many of them to be incompetent and often dishonest. A striking case, and which I am sorry to say is typical in many sections of our country, came to my attention in Alabama. A foreman in the employ of a certain county was discharged by the commissioner of the district in which he had been working. The commissioner gave as a reason for discharge, that he himself could look after the teams and hands and thereby save the county several dollars a month. The foreman resented his being discharged and took upon himself the investigation of the commissioner's record. He found that on a certain day this commissioner drove seven miles to a small bridge where he then and there made a contract with a party to repair the bridge at a cost of $1.50. A few days later he went back to this bridge to inspect the work he had ordered done. The record of the Com- $1.50 and cost of inspection two days at $3 to $6. Did this commissioner do a dishonest act? He certainly was entitled to pay for at least the time consumed by himself yet it is manifestly wrong for such a condition to exist that cost of supervision is four times that of construction or repair. This would have been a very small matter to an engineer who, while having the bridge repaired, would attend to many other duties.

It is almost impossible to convince many county officials that an engineer can easily save his salary several times over by making certain changes in location and



Giant Eucaliptus, pepper trees and wild flowers, with orange grove background add beauty to this fine Los Angeles county road

grade and by economically administering the affairs of the county. As a general rule a county gets more in return for money spent for engineering services than for any other single item connected with road construction. A good engineer is a dividend producer for a county. In speaking along this line at the American Road Congress held in Atlantaic City in 1912, Col. W. D. Sohier said:

You will find if you look at any private corporation,

that the ordinary engineering expenses for any work of the character of road building, any constructional work, is usually about 10 per cent, and that it is good money well spent.

Someone has said that an engineer is a man who can do as much with one dollar as a fool can with two. Evidently he did not have reference to the fool engineer.

The most expensive fool is the fool engineer. He is to a very great extent responsible for the prejudice many have against engineering supervision of road construction. There is absolutely no excuse for a county employing an incompetent man, now that the government, through the office of public roads, stands ready and anxious to aid any county in securing a good engineer. An engineer applying for a position should be endorsed by those for whom he has worked and by men competent to pass judgment on engineering work. It is an easy matter for a man to get endorsements from friends who have perhaps known him in a social way, but such are only beneficial to prove his good character. An engineer with only a good character will build a road without any "character."

A highway engineer should have a good technical education and to be successful, he must be practical and he must be a diplomat. He should be sober, honest, energetic and think more about the work he is trying to do than the pay check he will receive at the end of the month. When taking charge of a county's road affairs he should convince the commissioners that he knows more than they do about building roads and then proceed to prove it by doing good work. Unless an engineer can absolutely convince his board of commissioners that he knows his business, he had best resign. Trouble is often brought about by the engineer failing to have a thorough understanding as to his duties. This can easily be avoided if, when an engineer makes a contract with a county, he clearly sets forth in this contract what his duties are. If he is to be held responsible, and he should be, for the success of the undertaking, he should have full power to employ and discharge those under him. I think this is well expressed in Rule 2 of Rules and Regulations of the State Highway Department of Alabama, which reads as follows:

The functions of the commission are judicial and those of the engineer, executive. The engineer will receive and carry out the directions of the commission and shall, in turn, direct those under him. The engineer shall have full charge of construction work, directing it in all its details. Any orders the commission wish to give an employe shall be given through the engineer, and the engineer shall have the right to employ, with the consent of the commission, and to suspend, subject to discharge, without consulting the commission. All suspensions shall be reported to the commission for such action as they deem necessary.

In conclusion, let me say to you who are commissioned to spend the people's money, if you are in doubt as to the advisability of employing an engineer, observe closely the roads of a county built without the guiding hand of an engineer and then those of another that have been built by a man skilled in highway engineering. Don't employ a man whose only qualification is that he is cheap. His salary will be small and his mistakes will be many and expensive.

When you are sick you call the doctor,
When you are mad you call the lawyer,
When you are hungry you call the baker,
When you are broke you call the banker,
When you are in trouble you call the preacher,
When you are ignorant you call the teacher,
When you want cotton you call the farmer,

Then, when you are in need of good roads, why don't you call the engineer, that good roads physician who will heal the wounds of the country roads, who will operate upon their surfaces and place them in perfect order.

In conclusion, permit me to say, I have no ill-will or animosity for any road official. I have tried to point out some of their false ideas and mistakes and offered, as best I could, a remedy.

Successful Run Over Lincoln Highway.

The Lincoln highway has been covered from New York to San Francisco in one day. Complete reports from the many drivers who took part in the great cross-country run indicate that not a foot of the way, except where actual road construction made driving impossible, was left uninspected by official Lincoln highway representatives on Dec. 11. The Lincoln highway association has settled by one great demonstration the question of whether or not the route will be ready for tourists in the spring.

More than 200 Lincoln highway consuls and officially appointed drivers took part in the run. Each man started at a given point and drove over the Lincoln highway to the next point west and return, observing the condition of the road, the number of markers for the guidance of the tourist and the work in progress. This information, along with the weather conditions prevailing and the mileage covered, was wired to the headquarters of the association at Detroit, where it will be compiled for the use of transcontinental tourists.

On the morning after the run more than 100 wires were received from as many points along the cross-country trail. Messages were received from every state crossed by the highway and from some of the states, where long mileages and many cities and towns made the subdivision of the task necessary, from twelve to twenty wires were received.

The reports indicate that more than 75 per cent of the total distance is thoroughly marked, "thoroughly" indicating one marker every eighth of a mile. No tourist could lose his bearings on such a road.

The reports showed a wide range of temperature. Many sections in the west, and particularly at high altitudes, were driven in a cold mist and with some wind, the temperature below freezing. Other sections reported warm and clear, with a temperature as high as 55.

Every kind of road was negotiated, from the macadam boulevard of New Jersey and Pennsylvania, the cement and brick stretches of Indiana and Ohio to the smooth, hard, well-dragged mud roads of Nebraska, the prairie stretches of Wyoming and the desert flats of Utah and Nevada, where mile-a-minute speed was made between the scattered ranch houses.

"The reports of our drivers, all men of unquestioned veracity, settle for all time the question of a through transcontinental road," said A. R. Pardington, vice-president of the Lincoln Highway association. "The Lincoln highway can no longer be referred to as a 'proposed' route; it is there, it is open for 3,400 miles. We have settled the question of where to drive next year for thousands of tourists."

Richmond, Va., will lay 13,000 square yards of paving. The city has entered upon a new policy in road improvement and will spend approximately $100,000 in building country roads within a radius of 10 miles of Richmond.

Drainage Structures

By W. E. ATKINSON

State Highway Engineer of Louisiana

DRAINAGE structures like many other features of highway construction require the consideration of many factors in determining the type and character of construction adaptable to any particular location, or in determining a uniform standard or design to be used throughout any particular proposed highway project. Inasmuch as road construction together with drainage structures are more or less problems to be

W. E. ATKINSON

solved by every state or highway commission to meet local conditions, I shall not attempt to set forth any rules or plans governing the type or construction of all drainage structures, but merely present to you some of the general methods, factors and policies governing the construction of such drainage structures in Louisiana, under the supervision of its highway department.

In determining the length of bridges and spans between bents and piers and the size of culverts, consideration is given to the maximum rainfall, amount of run off, average slope of ground of drainage area, seepage, etc., as included in the same factors governing similar structures under railroad construction. After determining the required opening for waterway, the factor governing the required strength or carrying power of the structure is determined, so far as it is possible, upon the maximum load the structure is likely to be subjected during its bonded life. As to the bonded life of structures of this character, it is figured that they should last until bonds or taxes voted for the construction of same are retired, all structures being computed, however, to safely carry a minimum live load of not less than ten tons, plus 50 per cent impact and a factor of safety of four.

It has been the policy of the highway commission of Louisiana to construct, wherever funds and conditions will permit, permanent structures and adopt uniform and standard plans for bridges and culverts for any particular highway project, however, oftentimes different designs are necessary to meet existing conditions, the type and design of bridges, whether they be of wood, concrete, or masonry, etc., are determined largely by the amount of funds available, and the character and nature of soil for foundation.

Due to the alluvial character of the soil, with the exception of some sections in the northern part of the state, there are instances where it is not safe nor economical to construct the arch type of concrete bridges; even with some of our girder and slab bridges, it oftentimes becomes necessary to provide pile foundations for the piers, abutments and wing walls. In some places it is necessary these piles be of concrete instead of wood on account of many reclamation projects, now under way, lowering the ground water which would become detrimental to the latter type of construction.

We have found it advantageous and economical to provide, where conditions will permit, a uniform design for all drainage structures, especially for those of concrete construction, that the contractor may use the same drainage forms over and over, permitting thereby much lower bids per cubic yard on such work than otherwise under a system of non-uniform standard designs for such structures, and in addition, many times permitting, without greater cost, greater waterway opening than theoretically computed, resulting in a larger factor of safety, and often providing for some unprecendented rainfall or cloudburst not anticipated. In addition to concrete bridges, the department is building many wooden bridges, both of creosoted and uncreosoted materials, this character of construction predominating in some parishes due to lack of funds for more permanent construction.

The department has installed several types of culverts, that of vitrified clay, cement, concrete, cast iron, wood, corrugated galvanized iron, etc., the type of construction being governed by the available funds and topographical features together with character of soil encountered in foundation, however, where practicable, concrete has always been recommended.

At many places, however, we have found it impracticable and not economical to use concrete culverts and others of a monolithic character, especially in some of the bayous and coulees. In one place in particular, it is recalled, where the foundation in one bayou was so poor that a strip 2 inches by 2 inches by 16 feet was pushed down its full length in the bottom of the bayou, and could have been pushed farther if the strip had been longer. This bayou was 250 feet wide across the top and 25 feet deep, and the only opening necessary was that of an equalizer with an area of some 28 square feet to be filled over with earth, thereby making a bridge of earth and of an equalizer. The equalizer installed at this particular location, was a ten gauge 6 feet diameter corrugated galvanized iron pipe culvert. The entire cost of this combination bridge, if it may

be so termed, amounted to $2,059.27, including an item of $215.73 for riprap, whereas to have bridged the bayou with concrete, or to have attempted to build a concrete culvert, would have made the cost very much in excess of this amount. The only weak point I see, relative to this construction, is the more or less uncertainty as to the lasting qualities of the culvert from corrosion. This is stated merely to show some of the conditions that have to be met in Louisiana.

Due to debris, drift wood, and other extraneous matter, our highway department has adopted a policy not to install any culverts of less than 18 inches in diameter where possible, it preferring that they should be not less than 24 inches in diameter.

No doubt many of you will take issue with me on this point, but my experience has been that culverts of these sizes have proven more satisfactory and given better service, requiring less maintenance both for road and culvert at such places than when culverts of less diameter are used, even though the smaller culverts are ample to carry the water, due to the ineffectivenss of the latter from drift choking and filling them up.

I have yet to find my first culvert that is too large for the amount of water and rainfall to be drained, but many have I found that were too small.

The Cotton Belt Highway

By W. S. GILBRAITH

Secretary Hoosier Motor Club, Indianapolis, Ind.

There are 1,000,000 motorists north of the Ohio river who are ready and willing to tour into the south this winter, next winter, and every winter. Their number is increasing rapidly. Do you want your share of this tourist traffic? Yes, you do. Here is the reason you do:

Let us take, for example, the states of Minnesota, Wisconsin, Iowa, Missouri, Michigan, Illinois, and Ohio, comprising seven of the great central western states nearest the center of population, and north of the Ohio river; they have a population of more than 29,426,866, and own more than 616,744 automobiles.

The average owner of a car starts out on short tours. Gradually his horizon is extended; his country has grown smaller, and he seeks broader fields. First it is the township, next the county, then the state, until finally he seeks to see his own country, to tour in his own way and enjoy his touring, far from the noise and clatter of the train, cinders and the cooped-up cage of a Pullman, out in the open, where nature reigns supreme. He is willing to take a little more time put up with some labors and discomforts, in order that he may have relief from his daily cares and procure a change.

The great country south of the Ohio river is undoubtedly rich in scenery and points of interest. Just now she is feeling the need of new money, money that is to come in from the outside in exchange for her products. She is looking forward to the advent of new investors who will help in the development of her vast resources. What percentage of those who rush through your country on a train can see for themselves what you have to offer for investment? Do you want a percentage of these 600,000 motorists to visit with you? Do you want them to stop and spend an hour, a day, a week, a month seeing the sights, meeting your people, learning about your country, what you have for investors? Six hundred thousand motorists, reaching out, gradually extending their lines, touring, seeing things. Just think of it all!

We very conservatively can say that 10 per cent of this number of tourists are long-distance men. That would mean, 61,674 tourists. Now, the average long-distance man carries three to four people in his car. This means, at three people per car, 185,022 people. It is carefully estimated that it is impossible to take these trips under $5 per person per day. This means $925,110 spent per day for a five-day trip, $4,625,550. And these estimates are purposely made extremely low.

Take the map of the United States and you will observe that the most logical touring ground for these people is through Kentucky, Tennessee, into Georgia, Alabama, Mississippi, and Florida. Right here at your doors is a population of close to 40,000,000, who know little or nothing about the country. Nothing spreads like the good stories of motorists. One man makes the trip, he tells dozens of others, a percentage of whom soon follow. Soon there is a steady stream, all leaving their mite of dollars. New money! Any community can trade just so far on its own coin. Stagnation soon comes; it is the new money which is needed.

The west has awakened to this, hence their great interest in the Lincoln highway and others. In one section of the west the citizens built of their own labor a piece of road to enable the Indiana-Pacific tourists' eighteen cars to pass through their section. No automobile had ever before been over that road. After their passage 500 cars went through in the thirty days following. Since the improvement and marking of the Lincoln highway, the city of South Bend, Ind., has had an average of eighty touring parties per day. One day 180 were registered.

The possibilities of the south central and southeastern states for gain from the touring travel are beyond those in any other section. With one trunk line a cotton belt route from, say, South Bend, Ind., down through Indianapolis, Louisville, Nashville, Chattanooga, Atlanta, and Macon to Jacksonville, there would be an inflow of travel which would bring with it this new money the south so badly needs, making up for the temporary loss of a cotton market and advertising your country without an outlay on your part—in fact, the motorist pays you for letting him advertise you.

A continuous, connected, improved highway will do this—a highway which begins somewhere and ends somewhere. A boulevard beginning in the mud and ending in the mud means very little, and brings you nothing. A main artery, continuous, connected and improved is needed.

The State Roads Commission of Maryland has shut down on all road work for the winter season. Repair work where it is absolutely necessary, will go on throughout the cold months, and contractors on short stretches of road, which are nearly completed, will probably be permitted to finish work at once. The shutdown has caused the laying off of nearly 200 field employes of the commission.

A Shell Road on the Eastern Shore af Maryland, treated with Liquid Asphalt

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1915.

With this number Southern Good Roads begins its sixth year. The magazine was established in January, 1910 and its growth from the very first issue, has been steady. Every month has seen a gain over the preceding month and the future was never brighter. Our circulation has grown until today there is not a Southern town of any importance that does not reeeive monthly a goodly bundle of our magazines. We eover the Southern states as no other similar publication does.

We have worked hard for the cause of good roads in the South. We have championed faithfully and vigorously the cause of federal aid, state supervision of road construction, bond issues for roads, state highway departments and the divorcing of road affairs from politics. We believe that our efforts have not been in vain and that we have helped, in a measure, to bring some badly needed reforms to pass in several Southern states. Prospects for great improvement along all lines of road improvement were never brighter than they are today.

To our faithful host of readers we extend our sincere thanks for their unfailing support. We want the readers of the magazine to feel that they have had a part in the warfare we have been waging for better roads and streets and that whatever victories we have won are theirs, too.

We hope that every member of our big family will have a happy and prosperous New Year and that great things may be done for the Cause in 1915.

ROAD BUILDING IN THE SOUTH IN 1915.

When misguided business men of the South started the "buy-a-bale" movement a few months ago, they thought they were doing the farmers of the South a great favor. Newspapers all over the land, took up the proposition and devoted column after column to hysterieal editorials and screaming special articles, urging merchants, manufacturers and professional men to "buy a bale of eotton." Many thousands of bales of eotton were bought at 10 eents per pound and stored away. There may have been a few cases when these purchases relieved some distressed farmer, but the cases are mighty few and far between. The whole disgusting movement did not do any real or lasting good and served only to eonvince outsiders that the South was a pauper land, inhabited by beggars.

This impression has gained sueh a strong hold on our brethren of the north that instead of laying plans for increasing their business operations in the South, some are actually considering staying out of the South this year. They see no prospect of doing business with a broken and dispirited people— pauperized by the failure of cotton to bring 1913 priees!

We had heard so much about the South's distress that we began to feel that there might be a little truth in the story somewhere, though we have been able to see no evidence of distress around us. With the view of finding out just what effect the low price of cotton was going to have on roadbuilding in the South, the editor of this magazine wrote to the heads of the highway departments and officials in charge of road work in every Southern state and asked for information as to the road work contemplated for 1915, the plans that are being laid for road building, etc.

The replies have been startling. From every Southern state come the most encouraging reports. We have assurance that 1915 will see the greatest awakeniug in road work in the history of the South. In every Southern state more good roads will be built in 1915 than were built in 1914. There is no thought of curtailiug highway expenditures beeause eotton is off a few eents on the pound. Paupers are scarce. The South has mighty few of them.

Pauperize the Great South by the failure of a single crop to bring high prices? It can't be done. A few years ago eotton sold as low as 5 cents per pound. We pulled through that without serious difficulty and today, with cotton selling at 7¾ and sure to bring 8 cents within the next month or two, we can see no room for the pessimist and the howler. The South is not a one-crop section now, whatever it has been in the past. Today the South grows great quantities of corn, tobaeeo, wheat and other products and her great herds of cattle, sheep, hogs, horses and mules are bringing in revenues

that more than offset the cotton deficit. Thousands of factories in all parts of the South are busy turning out finished products that are bringing and will continue to bring, streams of gold into our section.

The South is not a pauper. It is not a land of paupers. The cotton trouble, magnified to an outrageous degree, has given the South a black eye, and we must live that down. Let every Southern man and every Southern newspaper, use every power to correct this false impression that is abroad in the north. Unless this is done, our loss will be great indeed.

We are glad, therefore, to be able to report that in the building of highways the South will more than hold her own with rest of the nation in 1915, and to thoughtful men, that fact will help to dispel the notion that the South is bankrupt and her people in distress. There is no surer indication of prosperity than the building of good roads and the South's highway plans for 1915, as outlined by her road officials, indicate no small degree of prosperity.

Model Road Law And Politics.

To meet the insistent demand for a model road law it is probable that the newly constituted legislative committee of the American Highway Association will first direct its efforts toward outlining legislation covering the establishment and operation of state highway departments and the apportionment of state aid.

"A hasty review of state aid in operation convinces me that the most important step is to take the state highway department entirely out of politics," declares Walton Moore, chairman of the committee. "I find," says Mr. Moore, "that the most changes and the most troubles have occurred in those states where the highway departments are subject to political powers and are not conducted as nonpartisan technical departments."

Undoubtedly the committee will urge that every state highway department should consist of a non-partisan commission, composed partly ex-officio and partly by appointment, and that this commission should act in the capacity of a board of trustees for the purpose of appointing a competent state highway engineer and for the further purpose of acting as an intermediary, between him and the political branches of the state government. Experience has demonstrated that engineering positions should be filled by appointment rather than election and that the term of service should be as long as good service is rendered. The committee also finds great necessity for the classification of the roads and an apportionment of cost burdens to correspond with the classification. This means that one township should not bear the entire burden of roads which are used by several townships, and that one county should not bear the burden of a road that is used by several counties. Varying degrees of traffic call for improvements equally variable in character and cost so that the legislation which will ultimately be found desirable and necessary will apportion to each unit of government its responsibilities, burdens and benefits. The committee already has a complete compilation of all road laws and will shortly begin its further labors.

Aiken county, S. C., has let contracts for a road 19 miles in length to cost, including excavation and grading, $11,500.

Bulletin on Roads and Land Values.

The U. S. Department of Agriculture has issued a bulletin, No. 136, a copy of which may be obtained by any citizen interested, which gives specific examples of the relation between improved roads and adjacent land values, all of which afford additional proof that the motorist is not the only person benefitted by good roads.

In Franklin county, New York, where 124 miles of road were built, eight pieces of land selected at random increased 27.8 per cent. in value after the improved roads were constructed. In Lee county, Virginia, which built eighty-four miles of road, land similarly advanced 25 per cent. in value.

Spottsylvania county, in the same state, improved forty-one miles of road, and land sold for $44.74, where previous to the improvement it had brought just $20 less an acre.

Land on improved roads in the neighborhood of Petersburg, Va., advanced in about thirty instances from $15 to $30 an acre.

After Manatee county, Florida, had constructed sixty-four miles of macadam and shell road, land along the road went up $20 an acre in the course of two years, and land a mile away from the road showed an increase of $10 an acre.

Instructions to Patrolmen.

The following is a copy of the sheet of instructions sent to patrolmen along the Washington-Atlanta Highway by Mr. D. H. Winslow, superintendent in charge of the section of the highway in North Carolina and Virginia, this road having been selected for experimental work in road maintenance under the supervision of the U. S. Office of Public Roads:

Inspect your road, its entire section during a rainy day and locate all pond holes.

Use the road drag immediately after a rain.

Fill all depressions with good material.

On no account use worn out material, sod or sand from ditches.

Remove all glass, tin cans, nails, old iron, etc., from the road bed.

Renew all defective plank at culverts when necessary.

Should your road surface be very rough, a spike toothed harrow used while the road is wet will improve an earth, sand-clay, top-soil or gravel surface.

Cut the weeds both sides of the road. Use a mowing machine for this purpose if practical.

Cut all brush at inside of the curves and at railway crossings and culverts.

Remove the ridge between the wheel rut and the gutter by using the one horse cultivator and then use the drag to push the material toward the ditch.

See that all culverts are clear, with outlets and inlets in good order.

Paint all guard rails at culverts and bridges, etc.

Renew all signboards, mile-posts, when necessary and give the traveling public all the advice in regard to the routes within your power.

See that all labor and teams in your employ render full and satisfactory service.

Almost half of the bond issue fund of $1,000,000 for Harris county, Texas, roads has been put into the improvement and extension of roadways and bridges up to date, according to a report of County Auditor H. L. Washburn filed Dec. 24. The exact figures aggregate for the four commissioners precincts $497,816.97 paid out, leaving a balance of $502,183.03 remaining in the bond fund.

American Association of Highway Officials

At the Hotel Raleigh, Washington, D. C., on December the twelfth, 1914, was perfected a good roads organization that is destined to become the strongest and most powerful influence for good road work in the country.

To this meeting, which resulted in the final organization of the American Association of State Highway Officials, were invited the State Highway Commissioners and Engineers of all the states. There were present at the meeting the following: Wm. D. Sohier, chairman, Massachusetts Highway Commission; S. Percy Hooker, State Superintendent of Highways of New Hampshire; Paul D. Sargent, State Highway Engineer of Maine; George A. Ricker, Deputy State Highway Commissioner of New York; Col. E. A. Stevens, State Highway Commissioner of New Jersey; Henry G. Shirley, Chief Engineer, State Roads Commission of Maryland; O. E. Weller, chairman, State Roads Commission of Maryland; George P. Coleman, State Highway Commissioner of Virginia; A. D. Williams, chief road engineer of West Virginia; Robert C. Terrell, State Highway Commissioner of Kentucky; James R. Marker, State Highway Commissioner of Ohio; Lamar Cobb, state highway engineer of Arizona; Joseph Hyde Pratt, State Geologist and Engineer of North Carolina; Sidney Suggs, State Highway Commissioner of Oklahoma; F. M. Kerr, assistant state highway engineer of Louisiana; W. S. Keller, state highway engineer of Alabama; John Craft, chairman, State Highway Commission of Alabama; James H. MacDonald, former State Highway Commissioner of Connecticut; T. Warren Allen, former State Highway Commissioner of New York; Logan Waller Page, director U. S. Office of Public Roads; P. St. J. Wilson, assistant director, U. S. Office of Public Roads; J. E. Pennybacker, chief, Road Economics, U. S. Office of Public Roads. Colonel Sohier was officially authorized to represent the state of Rhode Island and Dr. Joseph Hyde Pratt was officially authorized to represent the states of Michigan and Arkansas.

The states of California, Washington, Oregon, Colorado, Montana, Kansas, Pennsylvania and Connecticut gave their full endorsement to the association by letter. North Dakota and Nebraska signified their interest in the organization of the association.

The association provides for three classes of membership, namely, active, associate and honorary. The active membership comprises, state highway commissioners and engineers, and the prineipal state highway officials having administrative control; associate members are composed of subordinate engineers and officials of the state highway department; honorary members comprise ex-state highway officials and the highway officials of other North American countries. The federal office of public roads is placed on the same basis as a state, and each state and the federal office of public roads have one vote. The dues for active membership are $5 per annum and for associate membership $3 per annum. Henry G. Shirley of Maryland was elected president, A. B. Fletcher of California, vice-president, Joseph Hyde Pratt of North Carolina, secretary, and F. F. Rogers of Michigan, treasurer.

The executive committee is as follows: George P. Coleman of Virginia, chairman, Wm. D. Sohier of Mas-

Stretch of extremely bad sandy road near Terra Cera, in Manatee county, Florida

The same road in Manatee county, Florida, after improvement under United Stater Office of Public Roads. The road has been surfaced with shell and is a delightful driveway

sachusetts, James R. Marker, of Ohio, E. A. Stevens of New Jersey and Lamar Cobb of Arizona. The members of the executive committee hold office for one, two, three, four and five years respectively and one new member is elected each year.

At two o'clock on the day of the meeting, the commissioners and engineers were received by President Wilson at the executive office at the White House.

After the completion of the organization, the association discussed federal aid and passed several resolutions relating to different phases of federal aid which were referred to the executive committee, as representing the general attitude of the association in regard to this question. There was a remarkable unanimity among the members as to the fundamental principles which should be observed in the question of federal co-operation with the states in public road work.

County Aid to Road Building.

With the object of gathering data that will help county and township officers to determine the best way of financing their local road improvements, the Office of Public Roads of the United States Department of agriculture has just published, under the title, "Highway Bonds" (Bulletin No. 136) an analysis of the economic features affecting the construction and maintenance of highways financed by bond issues.

The bulletin, which consists of 91 pages of text, with a number of maps and plates, gives complete tables of costs of various types of roads and the amounts of bond issues, as the result of inquiries addressed to county officers of all the counties, which brought definite returns from 1230 counties. These led the office to fix the total amount of highway and bridge construction bonds issued by counties and townships up to January 1, 1914, at $287,031,018. In addition, the bulletin gives elaborate tables and charts whereby county officers can determine the total cost and annual appropriation necessary for constructing different highways by bond issues.

The investigation shows that January 1, 1913, slightly over $202,000,00 in bonds were outstanding. During the past three years, county, district and township highway and bridge bonds were voted as follows:

1911	$29,200,022.00
1912	$31,793,274.00
1913	$50,655,554.00
Total for three years	$111,648,850.00

Up to January 1, 1914, there had also been voted state highways bonds to the amount of $158,590,000, which makes a grand total of all highway bonds voted and reported to the office of roads January 1, 1914, of $445,621,018, or very nearly a half billion dollars of state and county money expended or to be expended on highway and bridge improvements.

While many counties did not report the term of the highway bond issues, it was found that the mean term for approximately $47,000,000 issued prior to 1913 was 24.8 years. The issues of 1912 and 1913 which were studied indicated that bonds maturing in 20 years or less, or else retired under the serial payment plan, were more popular than those running over 20 years.

In speaking of bond conditions, the authors of the bulletin state that inasmuch as probably over 80% of local bonds for highways and bridges are still outstanding, the highway bond movement has yet to meet the test of repayment, and that the maximum outlay for the retirement of outstanding highway loans will apparently be reached in about 20 years.

The continued success of highway bonds as a means

of road improvement will depend largely, the authors point out, on whether or not the county authorities follow the following principles of sound road financing:

(a) A steady and well administered system of meeting interest and providing for the retirement of bonds on maturity, whether by means of a sinking fund, by the annuity method, or through serial payments.

(b) The limiting of expenditures for road improvements to sums which are warranted by the actual saving in cost of hauling that the road improvement will effect. In this item may also be considered increased tonnage which follows road improvement.

(c) Expending bond moneys only on roads of such a character that a satisfactory share of this money may be regarded as a permanent improvement. This means that the bond issue should not be spread so thin over an exorbitant mileage that the improvement will be largely superficial and practically disappear in a very short time.

This means, also, that a large percentage of the bond issue should go into building a satisfactory and permanent foundation for the road which would call principally for resurfacing repairs, rather than frequent complete reconstruction.

(d) Provision for proper maintenance and repair of a bond built road throughout the life of the bonds, so that when bonds are retired the county will still have an actual and valuable property to show for its expentures.

(e) Limiting the term of bonds so that the life of the bond will not exceed the life of the improvement.

Kentucky County Judges Association Meets.

The midwinter meeting of the Kentucky County Judges Association was held in Louisville, Ky., Thursday and Friday, Dec. 14 and 15. The most interesting feature of the meeting, according to the Louisville Post's account of the event, was the address of State Prison Commissioner Daniel E. Sullivan on the question of convict labor.

Contracts for employment of the 650 prisoners whose services will be released to contractors in January, said Mr. O'Sullivan, will extend for only one year, as compared to four formerly, in order that preliminary plans for working convicts on the roads of Kentucky may be facilitated.

Mr. O'Sullivan made it clear that even though these contracts are made for indoor work, some prisoners for road work will be available after March, and will be used, provided the courts hold constitutional the Huff law, declaring roads connecting county seats public works, and making it legal for convicts to work on them.

The people of the state had voted for convict work on roads, but the election had not been advertised properly and the vote was held void. This matter will be remedied, it is expected, at the first opportunity. It will be at least eighteen months before the legislature can do anything, said Mr. 'Sullivan, but the favorable vote by the people is regarded by the Board of Prison Commissioners as moral notice that the people want the prisoners worked in the open and not under the old system.

Mr. O'Sullivan stated that if the counties would pay $1 a day for each day each convict worked the roads, the state would manage the matter of feeding, clothing, sheltering and guarding the convicts so working. He urged county judges in attendance to co-operate with the state in making successful the system as soon as it can be put into operation. He said that only one county, Lawrence, has applied for convict labor so far, and that it has asked for at least twenty prisoners.

Z. D. Dunlap in Tennessee.

Mr. Z. D. Dunlap, of Washington, D. C., assistant director general of the National Highways Association, has just closed a very successful good roads campaign in Kentucky and is now engaged in organizing a strong good roads association in Tennessee, as a branch of the national organization.

Every county in the state will be asked to join in a movement to appeal to the legislature for the creation of a state highway commission. Already 61 have formed county units and by the middle of January it is believed that every one of the 96 counties will have perfected organizations to work with the state body in putting through remedial legislation.

The officers of the association, already selected, serve without pay. W. E. Myer of Carthage is president; James Palmer of Nashville, vice president; L. G. Boxwell of Nashville, acting secretary, and P. D. Houston of Nashville, treasurer.

Railroad Man Helps Florida Good Roads Association.

The Jacksonville Times-Union notes the fact that the Florida State Good Roads Association has just received a check for $100 from J. E. Ingraham, vice president of the Florida East Coast Railway, Flagler System, and in charge of its land and industrial work along the line. Mr. Ingraham believes with others that agricultural development and good roads go hand-in-hand. His remittance to the body was a source of much gratification, not only for the intrinsic value, but in his attitude toward the cause.

An acknowledgement of this gift and a word of appreciation for his zeal in the matter of good roads will be sent to the donor by Secretary J. P. Clarkson.

The officers of the good roads association are actively at work on its campaign to have enacted at the next session of the legislature a highway commission law. At the last session a bill for the creation of a highway commission was defeated by a small vote. It is believed that conditions have changed and that a different story of proceedings will be written of the next legislature.

Paper by Prof. C. M. Strahan Highly Praised.

Hon. E. R. Morgan, state highway engineer of Utah, on his return to Salt Lake City from the Atlanta good roads congress, had this to say of the very fine paper of Prof. C. M. Strahan, of the University of Georgia, on sand clay and top-soil roads:

"The congress was a great success. For my part, I was delighted with a paper read by Professor Strahan of the Georgia university. His subject was the construction and upkeep of dirt roads. Since 95 per cent of Utah's roads will probably be of dirt construction for many years, it was a question of absorbing interest to me and the paper was a masterly one. Professor Strahan has attacked the problem of building roads by proper mixture and blending of the soils and other materials afforded along the right of way. At a glance, the question points to wonderful economy, provided it is practicable. Professor Strahan proved that it is so under many different conditions if not under all."

Louisville, Ky., has contracted recently for more than 20,000 square yards of paving and considerable excavation.

Force Account

By P. J. WALSH

NO matter how contracts may be drawn up for construction work there is bound to arise some class of work which cannot be covered by unit prices set forth in original contract. Therefore this work has to be done on a force account basis termed as extra work not covered by contract.

Contractors should not be permitted to do any extra work on force account basis until the engineer in charge has gone over the situation with the contractor, on the ground, to determine the necessity for doing such work on this basis, and then should carefully read the contract and specifications to see if same is not covered by unit prices. This does not mean, however, that bills for extra work should be turned into yardage. This should not be tolerated in any event. What is intended, is that all work that comes clearly within the scope of the contract, for which there is a unit price, should not be done as extra work.

When verbal orders for extra work are given by the engineer in charge, they should immediately be confirmed by letter, clearly stating exactly what the bill was for, giving location and character of, or kind of work, and then in detail why same is not to be done by contract and copy of letter to be sent to county court.

Before the work is done on force account basis there should be agreed upon a per diem price, both on labor employed and contractor's equipment to be used on the work, copy of which should be confirmed by letter from contractors. Owing to the different class of laborers and foremen, a standard cannot be set on the labor items, but there will be supplied upon request by the chief road engineer of the State Road Bureau, prices of rental per diem to cover the different classes of equipment to be used.

There should be filled out daily in triplicate a blank from by the engineer or his timekeeper to cover the force account work for the day . This daily report should include an itemized statement of both men, equipment and supplies, which were employed and used during the day, and it is is necessary that the force be checked daily by the timekeeper or engineer in charge to ascertain that the statement is correct, and when found to be correct and having been signed by all four parties should be placed on file. One in the office of the engineer in charge, one in the office of contractor and one in the office of the county court. At the end of the month or when contractor's estimates fall due the engineer in charge should compile these daily reports into a monthly statement, which should be checked against bills rendered by contractor being governed entirely by signed daily reports which are on file. Where materials are used which is very often the case, contractors should furnish a receipted bill and where material is used, such as cement, explosives, etc., same should be checked upon receipt at the point of work by engineer, and when he is not present, contractor should advise him of receipt and the engineer should make a memorandum in the back of his time book.

The writer thinks a fair compensation for labor items should be actual cost plus ten per cent and on bills, actual cost plus three per cent, where no percentage should be allowed on equipment, it being undersood and agreed upon before hand as the percentage basis.

You gentlemen have undoubtedly heard contractors make this statement that there is no profit in force account work and when the job is small there is not very much profit when equipment is not used. But however, it is the writer's opinion on a ten per cent basis on labor employed the contractor has ample room for a small profit above his overhead expenses, such as office force and time keeper, which on small pieces of work should not be charged, being taken care of in the ten per cent allowed. When a force of over twenty-five men with equipment are employed there should be provided for the engineer a timekeeper to do nothing else but check receipts of material, hours laborers are employed and time plant is in actual use. The day rate should only be given to the superintendent, walking bosses, timekeepers, etc. No matter if the contractor carries them on a mouthly basis. Of course there are exceptions to this ruling when the job is entirely force account.

In regard to equipment in use, contractors should keep up all repairs. Plant to be paid for when in operation only. Bills, such as coal, oil, waste, etc., should be passed after receipt of same has been checked. This rule applies to explosives with the three per cent allowance.

There should be added to every contract, a clause covering force account work clearly stating just how the same is to be done and as to the percentage basis to be allowed.

Pike's Peak Ocean-to-Ocean Highway.

Delegates from five states gathered at the rooms of the Commerce Club at St. Joseph, Mo., last month to hear a resume of what had been accomplished during the past year on the Pikes Peak Ocean-to-Ocean Highway, one of the most popular highways in the United States. The meeting was the most enthusiastic yet held and every man present was very optimistic over future development and very hilarious over what has been accomplished since the highway was inaugurated.

C. F. Adams of Chillicothe, Mo., president of the association in the Missouri district, presided over the meeting. Secretary A. M. Henderson of Colorado Springs was also present. The reports from the different state organizations showed that the trail had been greatly improved during the past year and that an immense amount of work has been planned for the coming year. Delegates were present in large numbers from Colorado, Utah, Illinois, Kansas and Missouri, and several good roads boosters from Iowa, Indiana and other states also made talks.

The old officers were re-elected with one exception:

C. F. Adams of Chillicothe, Mo., president.

A. Q. Miller, of Belleville, Kans., first vice-president.

George E. McInnich of St. Joseph, second vice president.

G. W. Hughes, of Hume, Ill., third vice president.

A. W. Henderson, Colorado Springs, secretary.

Mr. Sumner R. Church, Manager, Research Department, Barrett Manufacturing Company, New York City, on December 7th delivered an illustrated lecture on "The Essential Physical and Chemical Properties of Creosote Oils for Wood Blocks" before the graduate students in highway engineering at Columbia University.

Systematizing Road Building

By CHARLES J. BENNETT
Highway Commissioner of Connecticut

IN the first place, it is necessary to realize that there are two results to be secured:

First—The proper and economical spending of a certain amount of money in the way best fitted to serve the general public, and

Second—The presentation of the method of spending this money to the public, so that it may be thoroughly informed as to how its money has been apportioned and what results have been reached. Such a record or report made to the public should be in simple language so that the most uninformed may understand the results desired and the ends achieved.

The first idea which should be applied in the organization of a highway department is the military system, that is, the department should be sub-divided so that each part might have certain duties with a definite amount of money to spend. Each sub-division should report directly to the superior officer to the military head. The organization should be such that no orders should be passed around a subordinate, but should rather go through a subordinate. It is quite necessary in dealing with a force of any magnitude that the rank and file should know the purpose of the organization and the wishes of the chief.

In the organization of a force, a chart should be prepared showing the connection between employees, showing to whom an employee should report and stating distinctly what his duties shall be. The best results are to be gained by delegating authority to a man and placing confidence in him, having in mind the theory that men are by nature honest and will endeavor to do right and gain good results if given the opportunity. Allowance should be made for honest mistakes and a careful report kept of such mistakes so that a man may realize, when removed, that the reasons for his removal are sound and based on results showing his lack of ability.

In selecting employees to deal with the public, men should be sought who are tactful, intelligent and polite in their intercourse with people. The employee should be instructed that at all times it is necessary for him to be fair and reasonable and to keep his temper. A public employee is a servant of the public and in his dealings with citizens should realize this fact, but he should also be firm and not afraid to refuse an unreasonable request.

A road department has, however, the duty of presenting its operations to the public eye, not only as results on the roads themselves, but in the success or failure of the department as a financial proposition. This presentation must be made in the form of a periodical report to some superior body, as the mayor of a city or the legislature of a state. The writer finds, in perusing many of the reports made, that there is an entire lack of system in presenting the information, made in such a manner that an expert accountant would be needed to find out results gained and even then, these results would be of little value. The spirit shown most in reports is that they claim general excellence for the department and try to justify its continuance. Certainly there are some failures made by roadbuilders, which should be reported for the good of the work. Reasons or failure should be stated, whether the failures be financial or physical.

It is quite possible and necessary to make an annual report which is readable and interesting to the layman. The text portion of such a report should be written in plain English without technical terms and with general results stated broadly and succinctly. Tabulation of records should be made as simply as possible and the cost per unit should give, not only definite figures, but should state furthermore, just what details were included in the units of work done. For instance, in one locality maintenance of roads does not include the oiling of the surface, while in other reports, this oiling is included, which, of course makes it impossible to compare the two costs, and for this reason, and many others, as stated above, the reports should show definitely what details are included under each heading, and the cost might be analyzed accordingly.

A. A. A. Will Meet in Boston.

Paul Revere's famous ride will be covered by the motorists who participate in the annual meeting of the American Automobile Association, to be held in Boston in May next. A mail vote of the entire directorate almost unanimously decided for a spring instead of a winter meeting, and so it was that the A. A. A. executive board, at its December session in Washington, D. C., with President John A. Wilson in the chair, decided to postpone the big meeting until May 17-18. At that time of the year the main highways in most of the states are in travelable condition, and it has long been the opinion of leading A. A. A. members that the annual gathering should be one to which the members could tour over the road.

Massachusetts is one of the few states which have established comprehensive highway systems, and for many the journey will also include New York, New Jersey, and Connecticut, all of which have arrived at a uniform method of procedure. Ohio is another state busily at work upon a main market road system, and all around it is expected that the motorists will add greatly to their roads building ideas en route to the annual convention, one part of which will be devoted to highway matters.

Boston and vicinity supply a great quantity of places of historic interest, and the modern presentation of the revolutionary ride from Charleston to Cambridge, to Concord and Lexington will be started by a signal from the old North church.

At the conclusion of the Boston meeting it is quite probable that a party of transcontinentalists will start for the Panama-Pacific Exposition in San Francisco, for several A. A. A. officers have signified their intention of making the cross-country trip at this time. There will not be any organized tour, nor is it likely that all will start at the same time and follow the same schedule. Dr. H. M. Rowe, president of the automobile club of Maryland and first vice-president of the national association, is a quite likely participant, while Lewis R. Spears, president of the Massachusetts State Association and a former A. A. A. president has in mind shipping to San Francisco and traveling eastward. Perhaps the two will touch fires at the point in Nebraska where the Meridian Road crosses the Lincoln Highway. If such a schedule can be arranged the meeting of these two transcontinental travelers will be celebrated by an automobile function of some kind, arranged by the Omaha Automobile Club.

GOOD ROADS NOTES
GATHERED HERE and THERE

Alabama.

The Alabama Good Roads Association at its last annual meeting agreed upon several measures which will be introduced in the legislature next month and their passage urged. The demands were embodied in the report of the legislative committee, and they include increased appropriation for state aid, permanency for the state highway commission, change of constitution to allow the working of state convicts on the roads, automobile tax and license to be used for the maintenance of roads. The state press very generally indorses these propositions.

The Birmingham Age-Herald says that there is a pronounced demand for a state highway department created with a highway engineer as a permanent officer. As it is now the engineer is simply an employe of the commission.

Several contracts for road construction under the state aid plan were approved and other contracts were authorized at a recent called meeting of the state highway commission. The members of the commission met in the offices of the highway department at the capitol. Chairman R. E. Spraggins, of Huntsville; Professor George N. Mitcham of Auburn; Dr. Eugene A. Smith, of University, and John Craft of Mobile, were present at the meeting; Major V. B. Atkins was detained by illness.

The following contracts, involving in each case an expenditure of $6,542, were approved by the commission:

Dale county with J. G. Brown Construction company, sand clay road; Randolph county with Nixon and Smith Construction Company; Marengo county with J. J. Dunnevant; Cullman county with Jordan and Phillips.

Contracts for state-aid work in the following counties were authorized: Cullman, Dade, Bibb and Wilcox.

* * *

Arkansas.

The annual meeting of the Arkansas Good Roads and Drainage Association will be held in Little Rock Monday and Tuesday, January 25 and 26, according to George R. Brown, secretary, of Little Rock. The selection of the time of meeting was referred to him by President C. M. Philpot of Pine Bluff, and Secretary Brown announced the dates last month.

The organization has been more or less educational in its efforts thus far, the work going little further than showing possibilities which might accrue from good roads. It is planned to make it much broader and more "actual" following the state meeting.

Actual road improvement will be the keynote of President Philpot's annual address as president of the organization, acording to statements he has made at Pine Bluff.

"This organization has chiefly songht to show what great benefits might accrue from good roads," Judge Philpot is quoted as saying. "Now that virtually everybody is of the same opinion on that point I am going to urge the association to give its attention to devising ways and means to get the good roads. I think that is the whole matter in a nutshell."

A program for the two days' convention, which will bring business men of all Arkansas together, is being prepared by President Philpot and Secretary Brown. Addresses by numerous persons of prominence will be heard.

* * *

Florida.

At a meeting of the board of county commissioners of Polk county specifications for the "sand-oil" road, one-fourth of a mile of which is to be put down in each of the five commissioners' districts, were adopted. The roads are to be twelve feet wide, three inches in thickness, where put down on sand, and two inches where the roadbed is of clay.—Tavares Herald.

We have heard one or two worry a little over increased taxes if the proposed bond issue carries. Figure a little, brother. At the present assessment valuation on a thousand dollar valuation your share would amount to just 50 cents for the whole works the first local roads. However much politicians may twist and year and less each succeeding year. A big investment, isn't it, for thirty miles of hard-surfaced roads and a bridge to Sarastota Key. Your share of the bridge tax would amount to about the price of good cigar. Now don't get fussy.—Sarasota Sun.

The best piece of road work ever done on this side of Volusia county has just been completed by W. C. Cannons, connecting DeLand and Glenwood on the DeLand-DeLeon road. Mr. Cannons completed his contract Thursday; the road was inspected and accepted Friday. Built out of DeLeon shell, the road is smooth and hard and is a credit to the contractor. Mr. H. W. Purcell has also built a good road from Glenwood to DeLeon,, but his section is not as smooth as Mr. Cannons' two sections. The difference may possibly be caused by the difference in the material, which came out of two different pits. A little scraping on Mr. Purcell's section, which is hard will probably put this section of the road in splendid condition. At the present time the road is a credit to the county.—DeLand News.

* * *

Georgia.

George C. Scales, senior engineer of the United States office of public roads, in charge of the Georgia section of the Washington-Atlanta highway, has written the following concerning his work:

"There are 16 counties crossed by the highway in Georgia and in all but four the officials have agreed to co-operate with the government in the maintenance proposition.

"During the past six months 40 miles of new construction have been built in 11 counties, aggregating $25,000; six counties will work through the winter grading and subsoiling.

"No sections are yet under maintenance on account of the repair construction work to be done this winter, but I expect all will be by spring."

* * *

Kentucky.

The University of Kentucky announces that its annual short course in highway engineering will begin January 4th, and has invited all those who build good

roads and are interested in good roads to be present. The instructions are free.

A bulletin issued by the University explains the object of this engineering course as follows:

"The short course in highway engineering has been designed to help advance the cause of good roads throughout the state of Kentucky. The advocates of good roads have realized that Kentucky will never have good roads until she has road builders, and that to have road builders, it is necessary to give such instructions as will best enable the man to handle the roads in his own county or community. It is hoped that every county engineer in the state will take advantage of this free course of instructions. A road builder will find no better place to get ideas than a place where 100 or more road builders are assembled. The interchanging of ideas will more than pay for the trouble. Men who expect to become road engineers, road inspectors, or road contractors, will find the course very beneficial and instructive.

"We do not expect to turn out finished engineers in two weeks, but we do expect to put men in a better way to study for themselves at their home, and a great many points will be brought out in the lectures and in the actual work that a man studying alone would never touch."

The Kentucky university is going at the matter in the right way. If we are to have good roads they must be constructed by those who know what they are doing. A large amount of money is lost in giving contracts to those who do not know how to build good roads. Kentucky is determined to see that experienced men do the work. It will prove a great thing for that state.

* * *

Louisiana.

P. M. Milner of the Louisiana Motor League, speaking of the progress of the movement for the New Orleans-Bay St. Louis-Pass, Pass Christian permanent highway, gives some encouraging news.

"On Thursday last (Dec. 10.) I had a meeting in the office of the State Board of Engineers with Mr. Atkinson, state highway engineer; Fritz Salmen, E. J. Domergue, representing the parish of St. Tammany, and H. S. Weston, representing Hancock county, Mississippi, to discuss the route of the new highway after crossing the Rigolets," said Mr. Milner. "An agreement was reached which will send this road, on account of economic conditions, through Slidell and thence east to Pearlington or Logtown.

"I have just returned from a trip to Chef Menteur and the Rigolets, made in company with Capt. William J. Hardee, City Engineer, and Mr. Albert Ashehaffenburg. Our surveying party has been out ten days, and we expect to conclude the actual survey of the road between Chef Menteur and the Rigolets by Tuesday night. Our estimate of the cost of this survey shows that it will run about $1000, which the Motor League of Louisiana, through Mr. Crawford H. Ellis, president, has guaranteed. On Tuesday (Dec. 22.) Capt. Hardee, E. E. Lafaye, commissioner of Public Works, Mr. Aschaffenburg and I will walk over the entire route showing the practicability of the lines selected by the surveyors. The surveying party is now within three miles of the Rigolets. Our party to-day walked over considerable of the ground, and then took the boat, which we have under charter from Mr. Fetterly, to the Rigolets. We went up into the lighthouse and from this point of vantage could definitely determine the proper point at which the bridge should be located. We were agreeably surprised to find that the distance across the Chef, at the point where we will cross on the bridge, is only 640 feet, and likewise that the distance across the Rigolets, near the lighthouse, where we will cross, is considerably less than generally understood. In fact, we believe we can get a crossing at a point which will not involve a greater length than 1200 or 1400 feet.

"All of this new road will be thrown up to a height several feet higher than the greatest storm height of water ever known, and in order to accomplish this the entire new line of road will lie along a canal which we will dredge thirty feet wide and eight feet deep. This will give a magnificent inland route from the Rigolets to Chef Menteur for the passage of tugs and pleasure vehicles during the stormiest weather.

"I regard the work which we are now undertaking, and to which we are all bending our energies for a successful completion, to be one that will be of inealculable benefit to the city of New Orleans."

* * *

Maryland.

According to a brief preliminary statement given out by the State Roads Commission this has been a remarkably active year in the work of building good roads. The 1914 legislature provided $6,600,000 for continuation of work upon the system as planned by the original survey. Contracts have been placed which will call for the expenditure of this whole amount. There are, it is said, between 400 and 450 miles of road which have either been completed during the year or have reached a stage of construction which assures that they will be completed next spring.

The building program of the roads commission for next year, as outlined by the Baltimore American, includes the bridge which is to span the Patapsco from the foot of Hanover street to the Baltimore county shore, and also the second bridge that will cross from Baltimore county to Anne Arundel. The contracts for this work have been placed and construction work will be pushed throughout the winter, in so far as weather conditions will permit. It is in expectation that contracts will be placed within the next thirty days which will assure that the state system of road building as now mapped out will be completed by the middle of next sumer, except as to the Patapsco Bridge and a few side lines of the system for which provisions have not yet been made.

As to the mileage cost of road building the average cost during 1913 was far below that of any previous year. The average cost for the current year has not yet been figured out. The maintenance cost of completed roads was $340 per mile in 1912 and $434 per mile in 1913. This suggests a rising ratio of annual maintenance cost, but experience is yet too meagre to justify conclusions about cost of repairs.

The Maryland State Turnpike Association, at a meeting last month at Frederick, determined upon a policy of working with the Good Roads Commission rather than in opposition to that body. While the meetings are for an interchange of ideas of pike owners, yet the social side receives much attention, and it may be said that this is the paramount object of the association.

Counsel George R. Dennis, of the association, in his address, took a fling at the very smooth state roads, over which horses can scarcely travel, and also the excessive cost of such roads and the fact that traction engines injure them. He said in part:

"If our inquiring and advisory friends who are so insistent open our building roads like the state would consult the report of the roads compansion, 1915, I believe they could find a convincing answer in the fol-

lowing paragraphs cited: 'If a doubt may exist in any quarter as to the wisdom of the state having undertaken in 1908 to build such a system as ours, it is manifestly too late to withdraw from the enterprise after having spent nearly $10,000,000 on the work. Using round figures only, it is estimated that it will take $9,000,000, including Baltimore city, twenty per cent. incorporated towns, bridges, improving turnpikes, etc., to complete the 1,285 mile system.'

"To tell the whole truth about the matter, no turnpike company could afford to accept as a present this 10 or 20 thousand dollar a mile road if the company was required to expend on unkeep and oiling the same amount as the state.

"Turnpike companies have performed a splendid public service and have contributed enormously to the development and wealth of the state."

The present officers of the association are: President, Thomas A. Murray, Baltimore; vice-president, Alexander Armstrong, Jr., Hagerstown; secretary and treasurer, O. C. Warehime, Frederick; counsel, George R. Dennis, Jr., Frederick.

* * *

North Carolina.

On his way to Raleigh to take up his duties as representative of Yadkin county in the General Assembly, Mr. S. Carter Williams gave out an interview at Winston-Salem in which he stated that at a good roads

A section of the Central Highway between Asheville and Waynesville

meeting of representatives of every Yadkin county township save one, held recently it was agreed that a bill be presented to the legislature, which if passed would authorize the issuing of $200,000 in bonds to be used for the construction of sand-clay roads in the county.

Mr. Williams is preparing the bill and hopes to get it through the legislature at an early date. Arrangements are already on foot to complete the plans for the election as soon as the bill is passed so that there may be no delay in placing the matter of good roads before the people of the county.

The bill will provide for calling an election to vote $200,000 in bonds, $125,000, of which will be used in the construction of three highways throughout the county. One highway will be run from the bridge that is to be built over the Yadkin river connecting Forsyth and Yadkin counties, to Marler where it will tap the highway from Elkin to Statesville. Another will extend from Rockford to the Davie county line and the third will extend from the bridge at Donnaha through East Bend to Booneville.

The remaining $75,000 will be used in the various townships acording to the amount of taxes paid, applying to any one of the through highways if it goes through the township, otherwise to lines leading to the main roads.

There has never been a road built in Yadkin, and this is the first bond election to be proposed in the county. Yadkin people however are awakening to the necessity of good roads and much enthusiasm in the matter is being manifested.

* * *

South Carolina.

Georgetown county's 300-mile system of good roads —the best in the eastern part of South Carolina—is being given a still further improvement that will be appreciated by visitors in automobiles especially.

At every X and Y in the whole system Supervisor Anderson is erecting steel fingerboards bearing legends in letters that can not be eradicated by rust, scale or the depredations of careless or malicious persons.

The fingerboards will be carried on top of ornamental iron standards, somewhat similar to those that carry street lights in cities and the standards are being set in concrete to assure permanency. Each fingerboard will carry two lines, giving the names of the next cross roads, ferry, settlement, village or town, an arrow pointing in the direction of the places named.

Every traveler by automobile knows the difficulty in ascertaining with anything like exactness the distance from one place to another. It is rarely the case that even the native knows precisely the distance from his own front gate to the nearest settlement. This will be obviated in Georgeaown county by the new fingerboards. Supervisor Anderson has gone over the whole roads system in an automobile with a tested meter, thus measuring accurately the distance between one place and another at which the markers are being placed. The sign system will be completed early in this month.

* * *

Tennessee.

Committees have been named in fifteen counties of East Tennessee for the purpose of effecting county unit organizations in their respective counties, so that each county may send a delegate to the state good roads convention to be held in Nashville in January. These committees were chosen following a good roads meeting in Knoxville, which was attended by about 150 delegates from all parts of East Tennessee.

The meeting in January has been called for the purpose of drafting a road measure to be presented to the Tennessee legislature at its next session, which will be equally beneficial to every part of the state.

W. E. Myer, president of the Tennessee Highway association, and Jesse Taylor, director general of the National Highway association, who attended the Knoxville meeting, expressed pleasure at the interest manifested as evidenced by the large attendance of delegates.

Counties in which committees have not been named will be organized within the next few weeks.

Delegates from the fifteen counties who will effect unit organizations in their home counties are:

Knox, T. E. Plyley, Cyrus Kehr, John W. Flenniken, John L. Callaway, John Douglass and R. O. Gallaher.

Greene, H. J. Wisecarver, Mosheim; C. C. Coile, Greenville.

Campbell, R. L. More, Jellico; A. J. Agee, Jacksboro; Phillip Francis, Jellico; Dr. D. W. Moore, Jellico.

Loudon, C. H. Bacon, Loudon; W. G. Lenoir, Philadelphia; Frank Weiss, Lenoir City.

Monroe, B. D. Jones, Sweetwater; James Axley, Tellico Plains; Dr. E. J. Foute, McGhee.

McMinn, A. N. Sherman, Athens; D. S. Stuart, Athens.

Cocke, W. D. McSween, Newport; R. M. Jones, Morristown; John B. Susong, Bridgeport.

Jefferson, G. W. Long, New Market; Arthur Holtsinger, Dandridge.

Polk, R. Meige Copeland, Benton; Page B. Blackmore, Isabella.

Washington, W. J. Barton, Johnson City.

Grainger, Dr. A. E. Foster, Blainville; Clem R. Tomlinson, Tate Spring; O. R. Tomlinson, Tate Spring.

Johnson, W. C. Allen, Mountain City.

Roane, W. E. McElwee, Rockwood; Polk Tarwater, Rockwood; Sam A. Brazeale Harriman.

Hamilton, J. Lee Allen, Chattanooga, F. R. Fowler, Chattanoga; H. Crumpliss, Jr., Chattanooga; F. C. Brown, Chattanooga.

Blount, R. W. Wells, Maryville; J. H. Staley, Maryville; D. R. Goddard, Maryville; Dr. J. A. McCulloch, Maryville; Sam Everett, Maryville.

* * *

Virginia.

Some interesting recommendations are made by State Highways Commissioner G. P. Coleman in his annual report, which was submitted to Governor Stuart last month.

The report recommends that the state laws be so amended that the convict road force may obtain with less difficulty the prisoners from the various jails of the state. The commissioner says:

"A great deal of difficulty has been experienced in getting men from some of the jails. We have applications on file for additional convict camps and could increase the present camps if we could get all the men who are sent to the jails, and in this way the counties and the state as a whole would reap great benefit from their labor.

"I would like to suggest for your consideration the following plan for the grouping of the prison population into four different classes: 1, long-term and dangerous men; 2, short-term men; 3, trusties; 4, paroled men."

He suggests that men of the first class be dressed in stripes and worked in stockades, under guard, and in the stone quarries and lime-grinding plant.

Short-term men he would dress in uniforms of blue or brown, and work under guard in camps.

The "trusties" he would garb in ordinary khaki suits, and allow them to work without guard as roller men, enginemen, cooks, yardmen, etc., in the road camps.

For the paroled men he suggests that they wear ordinary clothing and be assigned to the maintenance departments of state and county, employed as patrolmen on the road maintenance work, these men to be furnished with living quarters and paid a monthly wage by the counties for which they are working. They are to report once a month to some general head to be governed by the parole laws of the state.

The report shows that during the year ended September 30, work was done on 403 roads and ninety bridges, scattered through ninety-six counties. There are convict camps at work in thirty counties. There were employed about 1,700 convicts and jail prisoners. The cost of convict labor for the year was 52 9-10 cents a day for each man.

Washington.

President C. L. McKenzie of the Washington State Good Roads association has announced the appointment of Frank W. Guilbert, Spokane, as secretary of the state association, and has also given the personnel of the legislative and arrangement committees for the year.

The legislative committee is composed of C. L. Morris, King, chairman; Eli Rockey, Pacific; W. A. Bollinger, Okanogan; J. J. Donovan, Whatcom; Frank W. Guilbert, Spokane.

The convention arrangements committee is composed of J. C. Hubbell, chairman; J. H. Smithson and Phil Adams, all of Ellensburg.

The next annual meeting of the association will be at Ellensburg in November. The meeting of the legislative committee will likely be called by Chairman Morris for early in January, to be held probably at Tacoma or Olympia.

* * *

West Virginia.

From many inquiries received by the State Road Bureau of West Virginia it is evident that the new road laws, passed in 1913, relative to roads and bridges, have not received the careful study and understanding to which they are entitled. Doubtless realizing this state of affairs several papers, among them the Point Pleasant Register, carried the new law in the form of a continued article, beginning early in the fall and devoting a column or two each week. In addition to this State Road Bureau published the law in the form of a bulletin and a copy of the same can be procured by any resident of West Virginia upon application. An organized movement for better roads rests primarily upon a thorough understanding of this statute.

The following bulletins, written by experts connnected with the state road bureau have just been received from the printer: No. 12 Standard Contracts and Specifications for Grading. No. 13 Standard Contracts and Specifications for Water-bound and Bituminous Macadam Roads.

No. 14 Standard Contracts and Specifications for One and Two Course Concrete Roads.

In addition to the foregoing, No. 15 Standard Contracts and Specifications for Brick Roads will be received in the course of a few days. These bulletins are intended for the use of members of the county courts, throughout West Virginia, who will be enabled to enter into contract, relative to any particular phase of road building, without the necessity of having the same drafted by an attorney. In addition, the specifications are made out in blanks so the commissioners are required to fill in only the name of the contracting firm, thus eliminating the long delays heretofore experienced. Any or all of the above bulletins can be procured free of cost by any resident of this state.

Good Roads Campaign in Florida.

The active campaign of education which is to be conducted by the Florida State Good Roads Association with a view of securing adequate legislation at the coming session of the state legislature, had its beginning Saturday, Jan. 1, with the arrival of Charles E. Foote, good roads specialist, lecturer and writer, in Jacksonville.

Mr. Foote has been secured by the association to conduct its campaign and will make his headquarters in Jacksonville. He stated to Secretary J. P. Clarkson that he had his plans in line for the launching of the campaign and that there was little doubt of success.

The Indianapolis-to-Florida Highway in Tennessee.

Great interest has been aroused, in Tennessee at least, regarding the proposition of the Hoosier Motor Club, Indianapolis, to improve existing roads from that point to Florida. The Tennessee section of this highway is from the northern boundary to Nashville, and thence to Chattanooga, which is almost on the northern line of Georgia. The Chattanooga Automobile Club has taken the lead in urging betterment of that section between Chattanooga and Nashville. There is now practically no doubt that this road will soon be in good condition, every mile of it, and similar agitation is anticipated concerning the northern end of the highway which would result in its being brought up to the same standard.

A peculiar condition of affairs in Coffee county, which is traversed by a portion of the Chattanooga-Nashville highway, gave an opening for the automobile club to put in some effective work of encouragement and co-operation. In Coffee county, the court recently passed a resolution referring to the voters a $12,000 bond issue, in its intention only a starter towards a sufficient fund to provide the county with an adequate system of roads. It is proposed with that initial fund, $12,000, to grade two roads, twenty feet wide with 18 inch crown, traversing the county in two directions. One of these would follow the road as it now exists and is considerably used in spite of a pretty bad stretch from Pelham to Beech Grove. It is the declared intention of the county court to do this work for the purpose of putting the two trunk roads in better condition at the outset, and to render the macadamizing easier at some time in the future when funds shall be provided.

Unfortunately, a division of Coffee county sentiment relative to the small bond issue arose because the Nashville-Chattanooga road referred to does not touch Tullahoma but does pierce Manchester. The latter is county seat, and Tullahoma, an enterprising town on the edge of the county, the only other place of any size in Coffee, was very desirous of having Nashville-Chattanooga traffic pas sthat way. The Tullahomans claimed that they had not been duly consulted about the bond issue, as they should have been in view of their paying a third of the county taxes. A certain element in Tullahoma argued for a change in the route which, by a slight detour, would carry the Nashville-Chattanooga road through their town and Manchester as well. The Manchester people, and members of the county court, maintained that no discrimination against Tullahoma was intended, but that the work under the bond issue was designed for the best good of the whole county, and that the road making machinery would be first sent to the very doors of Tullahoma.

Becoming aware of the situation, the Chattanooga Automobile Club determined, if possible, to act as mediators and bring about a reconciliation to the end that the bond issue carry and the initial work be done on the two roads. Representatives of the club, chamber of commerce and tourist and convention bureau—all vitally interested—attended a meeting in Tullahoma. Their good offices resulted in a committee being appointed to visit Manchester in an attempt to heal the breach. The automobile club, by special train, went to Tullahoma and Manchester the following day, held very satisfactory, conciliatory meetings, and returned to Chattanooga with the feeling that improvement of the Nashville-Chattanooga road through Coffee county was assured for the near future, regardless of the $12,000 bond issue, because there are other routes, other ways and means, that will doubtless be adopted if the county court's plan is defeated.

Coffee county citizens will vote on the bonds December 5 and the outcome is awaited with interest. It was anticipated that committees representing Manchester and Tullahoma would reach a compromise the last week in November so that the election would be overwhelmingly for the bonds.

Benefit of Roads to Non-Abutting Property Owners.

The road-building specialists of the department, in Bulletin No. 136, entitled "Highway Bonds," have the following to say about the benefit of a well-constructed highway to property owners whose property is not directly on the road to be improved:

In planning the highway system or the main market roads it will be found necessary to omit many roads the improvement of which is greatly desired by abutting landowners. The fact that such property holders must pay a tax for the bond issue is only an apparent injustice, for if the highway system is well planned the entire county will feel the benefits of the improvement. As a rule, main market roads reach the majority of producing areas, and when they are improved all land values tend to increase.

The fact that cities and larger towns are frequently taxed for bond issues to build highways outside of their own limits is sometimes made a point of debate in bond elections. It is argued that because a large part of the county wealth is within the corporate limit of such cities and towns highway bond money should also be used to construct their streets. It is even urged that the expenditure should be made proportionate to the assessed valuation within the city limits. If the proceeds of highway bond issues were distributed in this way, their purpose in many cases would be defeated. The primary object of the county highway bond issue is to build county market roads and not to improve city streets, although a high percentage of the assessed valuation may be city property. It is now known that the expenditure of city taxes on country roads is a sound principle and that it is one of the best features of state aid for highways. In Massachusetts the city of Boston pays possibly 40 per cent of the total state highway fund, but not a mile of state-aid highway has been built within its limits. New York City also pays about 60 per cent of the cost of the state highway bonds. Some state laws prohibit the expenditure of proceeds of state highway bonds within corporate limits of cities or towns.

The improvement of market roads results in improved marketing conditions, which benefit the city. Most cities are essentially dependent upon the surrounding country for their prosperity and development. The development of suburban property for residence purposes is also dependent upon highway conditions, and it is becoming evident yearly that whatever makes for an increase in rural population must be encouraged. Since the introduction of motor traffic country highways are used to an increasing extent by city residents. In fact, the cost of maintaining many country highways has been greatly increased by the presence of city-owned motor vehicles. The general advance in facilities for doing country business from town headquarters when roads are improved is no inconsiderable factor in the commercial life of the community.

Waco, Tex., will hold an election on January 22 to decide on a bond issue of $15,000 for additional street improvement.

GOOD ROADS NOTES IN BRIEF

Morgan county, Tenn., has sold $270,000 of bonds and will begin the construction soon of a road system, 80 miles in length, which will serve every section of the county.

The city of Helena, Ark., will pave eight streets.

Tampa, Fla., will pave 24 streets, laying approximately 65,000 square yards of pavement.

Lake county, Fla., has contracted for 1,091,046 linear feet of highway, including a very large amount of excavation and filling and other work.

Hillsborough county, Fla., has contracted for two miles of vitrified brick highway between Knight's Station and Plant City, to cost $37,750.

Ashland, Ky., will spend $50,000 in the construction of 20,000 square yards of paving.

On January 19 Greenup county, Ky., will vote on a bond issue of $200,000 to re-construct and improve its entire road system.

Bell county, Ky., will hold an election on Feb. 13 on a bond issue of $250,000 for the construction of roads and bridges.

Commissioners of Monroe county, Miss., will construct three miles of concrete road.

Ingram township, Johnston county, N. C., will sell $40,000 of bonds for highway improvement.

Lamar county, Ala., will build roads with the proceeds of a $75,000 bond issue recently voted.

Road district No. 1 of Rapides parish, Louisiana, will vote on the 19th of this month on a bond issue of $100,000 for roads.

Hamilton county, Tenn., will spend $50,000 in the construction of a concrete street through Hill City and on various county roads.

Road District No. 3 of Navarro county, Tex., has contracted for 22 miles of roads.

Marshall county, Okla., will contract this month for the construction of a 55-mile road, with stone and concrete culverts.

It is announced from Manassas, Va., that the Washington & Valley Turnpike Co. will construct a 22 mile macadam road, to connect the Washington and Valley pikes. To provide funds, $150,000 of stock will be sold.

McKinney, Tex., will open bids in February for a large amount of street work. The city has available for street improvement $165,000.

Miami, Fla., will grade and pave a number of streets.

The highway authorities of Bexar, Guadalupe, Hays and Travis counties, Texas, will open bids on January 22 for the grading, surfacing with gravel and constructing bridges and culverts on the San Antonio-Austin post road, 71 miles long. A total of $229,000 is available for the building of this road.

Sherman, Tex., will lay 26,000 square yards of paving.

Sulphur Springs, Tex., is asking for bids on a large amount of street paving, concrete curb and gutter and other improvements.

Tuskegee, Ala., has $15,000 available for street improvement.

Gaston county, N. C., will vote soon on a bond issue of $150,000 for road building and other purposes.

Rutherford county, N. C., has contracted for about 50 miles of roads. The county has $100,000 available for road and bridge construction.

Road District No. 2 of Grimes county, Tex., votes this month on a $60,000 road bond issue. District No. 3 of the same county, contemplates a $30,000 bond issue for roads.

voted bonds for $200,000 for road construction.

The 1915 Good Roads Year Book will contain valuable statistics concerning the progress made in the United States last year in the construction of good roads. It will show that more than 34,000 miles of surfaced roads were constructed during 1913 and 1914, and that during the ten-year period from 1904 to 1914 more than 96,000 miles were completed. In 1904 there were only 153,000 miles of surfaced roads of all types in the United States. The total completed the present year is estimated at 18,000 miles. The report will likewise show that something like 30,000 miles of highways have been completed with the aid of state funds, of which over $200,000,000 have been expended.

Completing Tarrant County Roads.

It was announced from Fort Worth, Tex., on the first day of the present month, that with the exception of putting the last layer of oil on between forty and fifty miles of roadbed on the cardinal roads of Tarrant county, practically 137 miles of the Tarrant county system of public road is completed. This information was given out by Supervising Engineer Travilla's office.

It is expected to have the entire system of cardinal roads completed about Feb. 15, weather permitting. The commissioners of the various precincts are connecting up the cardinal roads with subcardinal roads throughout the county. The last cardinal road to be accepted was the highway from Fort Worth to Mansfield.

Warren and Hinds counties, Miss., have contracted for a 520-foot bridge across the Big Black River at Holt's Ferry to cost $9,708.

The commissioners of Bee county, Tex., have contracted for two bridges across San Domingo and Toro creeks to cost $5,500.

Waco, Tex., votes on Jan. 22 on a small bond issue for the construction of bridges.

Radford, Va., will build a bridge across New River at a cost of $12,500.

Lake county, Fla., will raise 57 bridges in connection with extensive road building operations that are to begin soon.

Nodaway, Andrew and Holt counties, Mo., will join to construct a bridge across Nodaway river, to cost $3,000.

Rutherford county, N. C., will spend about $4,000 in bridge construction in connection with road building operations.

The commissioners of Canadian county, Okla., have contracted for 16 steel bridges.

Knox county, Tenn., will spend $10,000 on bridges.

Alleghany county, Va., is asking for bids on a 100-foot steel bridge.

Scott county, Va., will bridge Big Moccasin creek, with a structure 87 feet long.

Bids are being asked on a bridge across the Chickahominy river, connecting Hanover and Henrico counties, Va., about two miles from Glen Allen.

"Seeing America" Will Be Popular.

That the American road traveler who has been lured to Europe by the connected main road systems of the older countries intends to "See America" in 1915, is made apparent by the growing volume of inquiries made to the national touring bureaus of the American Automobile Association in both New York City and Washington, D. C.

While the Western and Pacific Coast sections will appeal strongly to the easterner—for Yellowstone, Glacier, Snoqualmie, Columbia River, Yosemite, and Grand Canyon are names with which to conjure—the wonderful highway development in New York will command processions of motor car tourists in all parts of the diversified Empire State. Many a one who years ago successfully took Horace Greeley's advice of "Go West, young man!" is now an automobile owner, the possession of an interstate vehicle causes him to yearn for a look at the old town and old farm on the hill.

"There'll be much for this man and his family to see," comments Chairman George C. Diehl of the A. A. A. Good Roads Board, who as engineer of the county which contains the city of Buffalo has been prominent in New York State roads progress.

"The Empire comonwealth is now ready to supply a surprising highways homecoming to its former sons and daughters," asserts the A. A. A. officer, "and one hesitates to tell them too much about what has been accomplished since New York began spending over a hundred million dollars on its arteries of communication. Go where you will and there will be found evidence of roads building that meet the internal needs of

the state, from agricultural and scenic and health standpoints, for in these days it is recognized that all sections must be given attention because all contribute to the sum total.

"In its automobile reciprocity New York sets an example that has been entirely followed by only one other state, Vermont: an exchange of courtesies is offered for a single day or for the whole year. It is the general feeling that the amount of wear which a visitor may exact from the highways in the use of his rubber-shod wheels is more than offset by his daily expenditures, in addition to which he frequently becomes a permanent investor. Farm values on main market roads have advanced markedly, and bargains are no longer numerous.

"New York's attractions include Niagara Falls, at the western end, as well as a Watkins Glen and the alluring Genesee valley; the central New York lake region; the inspiring Adirondack Mountains country; Lakes George and Champlain, and the famed Hudson river, with its astounding Storm King road now under construction. New York City is a magnet which causes the metropolis to be included in the itinerary of any prolonged tour in the Eastern country. Near at hand the ocean front supplies innumerable seashore resorts, and all around the Empire state ranks second to none in appealing to those who study their country in the way only possible through motor-car tourists.

"One fact stands out in the propaganda urged by the American Automobile Association in reference to federal aid in roads building. While New York has either built or has now under way many miles of state and county and community roads, its national legislators favor federal help to the several states which, except in few instances, are only started on a comprehensive roads betterment. New York invites the stranger to partake of its fullest roads hospitality, and at the same time, as the most thickly populated and wealthiest state, is willing to accept a very substantial part of the cost of the highway's burden of the nation."

At a good roads meeting held at Hotel Tulsa, Tulsa, Okla., last month the statement was made that one county in Missouri alone, Jackson county, in which is situated Kansas City, was spending $1,500,000 annually for good roads. That city and county now have over 300 miles of rock or other paved streets and roads and are building them by the mile a week now. They expect to have every road in the county a rock road before they quit. It developed that by doing this work right the upkeep is very slight. Col. Sidney Suggs, the highway commissioner of Okla., and others who want to reclaim Oklahoma from the dust and mud were greatly encouraged by the reports made to them by visitors from cities and states that have accomplished results in this way.

The county judges of Pike, Floyd, Johnson, Lawrence and Boyd counties, Kentucky, will meet at Paintsville, Johnson county, during the first week in January, 1915, to discuss the advisability of building better highways in each of these counties, and to consider the building of a continuous highway from Ashland, Boyd county, to the Dickenson county, Va., line, passing through the other four counties on its way up the Sandy river. Private citizens at Pikeville are circulating petitions for signatures, which are addressed to the county authorities in behalf of good roads.

Pawnee county, Okla., will construct two expensive steel bridges with concrete floors and stone foundations.

SOUTHERN GOOD ROADS

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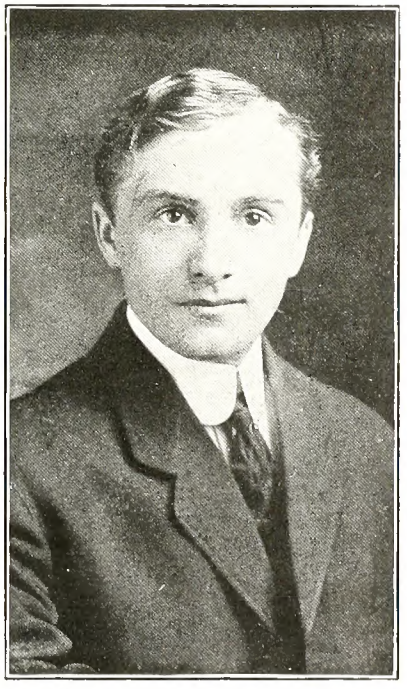
Road Economics

By HON. J. E. PENNYBACKER, JR.

Chief of Bureau of Road Economics, U. S. Office of Public Roads

ROAD economics may be defined as that branch of economic science which treats of the cost and use of a road as a public utility. Cost and public utility, in a comprehensive interpretation, are the determining factors with reference to the amount of money to be expended, the methods of its procurement, the liquidation of any indebtedness incurred in connection therewith,



HON. J. E PENNYBACKEF, JR.

the location of the improvement, the character of the work, economy in the managmement of the project, and the utilization of the completed road for the economic benefit of the public.

The subject is logically comprised in two divisions, the first of which deals with those larger questions of legislation, finance, organization, road classification or selection, the utilization of collateral agencies, and the management of the road as a completed project. The second division of the subject although more limited in scope than the first division is important from the standpoint of economy and efficieney, as it relates to the various activities in connecton wth the actual work of construction. Examples under this division would be the lowering of cost by the intelligent use of labor-saving machinery; the keeping of adequate and efficient cost records so as to detect extravagance, incompetence or dishonesty; the systematic purchase of materials, and the use of such other measures as would serve to produce a satisfactory road at the lowest practicable outlay.

Legislation, to be effective, must be economically sound, and it is necessary to the intelligent framing of road laws that the economic considerations applicable to the subject should be known and accepted by the legislators. A system of financing road improvement is largely the outcome of legislation, but is often modified by the exercise of administrative discretion. Organization, like finance, is to a great extent prescribed by statute, but here again the personal equation enters largely in the determination of efficiency or inefficiency. The utilization of collateral facilities of the state such as convict labor and the aid of state institutions for investigative and educational work is largely determined by law but here again administrative discretion and the personal equation play an important part. The classification and selection of roads for improvement, although resting upon legislative enactment are much more largely an administrative question than those to which I have already referred, and the same holds true with reference to the use of the road after completion so as to best serve its purpose as a public utility.

It is thus evident that these basic factors should be correlated and that the undertaking as a whole should conform to those economic considerations which may be regarded as fundamentally sound. I have, therefore, formulated ten fundamental propositions which I hold to be incontrovertible and so self-evident as to be axiomatic. I shall, therefore, first submit these ten axiomatic propositions, and then endeavor to explain to you their practical application.

1. That all who share in the benefits of road improvement should share proportionately in the burdens.

2. That the degree of improvement should be proportionate to the traffic importance of the road improved.

3. That the rate of payment or the rate of accumulation of the sinking fund on any public debt contracted for road improvement should approximately equal the deterioration of the improvement.

4. That road building and maintenance comprise

A paper read at the Fourth American Road Congress, Atlanta, Ga., Nov. 9-14, 1915.

work requiring special qualifications on the part of those who direct it.

5. That responsibilities should be definite as to persons.

6. That continuous employment is more conducive to efficient service than intermittent and temporary employment.

7. That the specialists who direct road work should be appointed instead of elected; and that they should hold office during efficiency instead of for a fixed term.

8. That no road is wholly permanent and that it requires continuous upkeep, for which financial and supervisory provisions must be made.

9. That cash is a much more satisfactory form of tax than is labor.

10. That all agencies at the disposal of the state, capable of use in works of public improvement, should be so used, rather than in such commercial production as would conflict with private enterprises.

The practical application of these ten axiomatic propositions does not involve intricate or impracticable procedure. Under the first proposition, that burdens and benefits should be shared proportionately, I would call attention to the fact that the country road is no longer a mere local utility. The product of the farm is absolutely essential to the existence of the city population, while, conversely, the product of the city factories finds its way to the most remote country districts. There is an inter-dependence which should carry with it a co-operative sharing of the burdens incident to improving the facilities of transportation between country and city. Legislation should, therefore, be framed so as to provide for city taxation in aid of country road improvement. Automobile owners should individually pay a material portion of the cost of our public roads, and they are already cheerfully doing so in many of the states. Last year the state revenues derived from automobiles amounted to about eight million dollars applicable to roads, out of a total from all sources, state and local, of about two hundred and five million dollars. The exact method of apportioning the road taxes is a detail which can readily be worked out by each individual state.

The second proposition, which calls for the improvement of roads in proportion to their traffic importance, strikes at the very root of our present method of apportioning road improvement. Too often have we seen examples of costly improvements distributed according to the dictates of a few influential citizens or according to some arbitrary arrangement of political units or for sentimental reasons, or through a cheerful, haphazard indifference. It is now generally believed that four-fifths of the traffic of this country is carried on one-fifth of the road mileage. It should be manifest that the most heavily traveled roads should first receive attention and should be improved in the most substantial manner. It is entirely feasible to make an expert study of a county road system and indicate graphically the traffic areas for each important road, much as you would show drainage areas for waterways. The yield and the probable traffic in ton miles for these traffic areas can be readily determined so as to establish with reasonable exactness the amount of outlay which the traffic would justify. The relative cost of such a determination would be almost negligible if incurred as a preliminary to a large outlay for actual construction.

The third proposition, that debts should be liquidated in proportion to the deterioration of the road, is intended to prevent the incurring of a debt which will outlive the utility which it was designed to create. There are two extremes in the controversy which rages over this question of public debt. There is the one faction which either opposes debt in any degree, or contends for an indebtedness of such short term as to make it almost a cash transaction, and asserts that the road is entirely destroyed long before the debt becomes due. The other extreme faction contends for long-term indebedness, on the theory that as posterity will reap the benefits it should bear the burdens, and that a road well maintained never wears out. As a matter of fact, location, if intelligently made, should be permanent; likewise all reduction of grades. The drainage features, if honestly and efficiently constructed, should be reasonably permanent. The road, except under extraordinary conditions, should, therefore, be considered reasonably permanent as to these features. As a general rule, the foundation of a road should not require renewal if the road is subjected to adequate and continuous maintenance. Avoiding any detailed consideration of the exact proportion of the total cost of a road represented by these features, I should say that in general the permanent features would average at least 50 per cent of the total cost. So that, if the other 50 per cent must be figured as perishable and subject to renewal, the debt should not cover a period longer than twice the length of this perishable portion. For example, if a macadam road is constructed at a cost of $6,000 per mile and has an estimated life of ten years, the bonds could run twenty years, because, at the end of ten years, the depreciation is $3,000 and the actual value is $3,000. Another expenditure of $3,000 is made and at the end of the twenty years when the bonds become due, there has been a total outlay of $9,000, against which should be credited the permanent value of the road at $3,000, making the net outlay $6,000, or the face amount of the bonds. This is merely an example and a generalization. It would be desirable to ascertain the permanent and perishable portions in each undertaking.

The fourth proposition, which calls for the employment of specialists in road work, is so nearly self-evident in its application as to require very little explanation. I should say, however, that if the laws of the state would require that all persons selected to have immediate direction of road or bridge construction and maintenance must possess practical knowledge and experience, and if this fitness should be tested by some sort of competitive examination to be prescribed by a state highway department, acting either directly or through a civil service commission, the net result would undoubtedly be the saving of many millions of dollars of road revenue and a wonderfully increased efficiency in our road system.

The fifth proposition, that responsibilities should be definite as to persons, is aimed at the elimination of our present complex and cumbersome system of road management. If all of this antiquated organization could be swept aside and in its stead one or a few officials endowed with authority and charged with responsibility in each county, the beneficial effects could not fail to be most marked. If the people, individually or in a representative capacity, could immediately place their finger, so to speak, upon the man responsible for the discharge of public duties we should have no more political juggling and the passing of responsibilities and duties onward in an endless chain.

The sixth proposition, that continuous employment is more conducive to efficiency than temporary employment, finds its antithesis in our present annual or semi-annual junket which we call "working the roads." It is so self-evident that a minor defect in a road can be

repaired at its inception with little effort, and that if allowed to go on it may require the entire reconstruction of the road surface, that it seems scarcely necessary to urge the soundness of this proposition. If a small force of laborers with necessary tools and teams were employed throughout the year on the roads it would not cost any more money than to call out a small-sized army of road hands twice a year, and would not only result in quick repairs where needed but would also insure that the most work would be done

The River Road, in Spottsylvania County, Va., before improvement.

at the places where it was most needed. The force would be small, mobile, trained, interested, subject to effective discipline and altogether infinitely more efficient than the unwieldly forces now employed.

The seventh proposition, which calls for appointment rather than election and for the holding of office during efficiency instead of for fixed terms, is designed to attract to the work men who look upon road-building as a life profession or occupation. A good engineer may be a very poor politician and a good politician may be a very poor engineer, but in a contest in which votes are essential the good politician will usually defeat the good engineer, although the position requires engineering ability rather than political ability. Do not spoil a good highway engineer or superintendent by making him cater to the popular fancy. If he is the right man in the right place, it is absurd to limit him to a fixed term, for his position is not a reward. The county is purchasing his services and is supposed to get value received, and it should continue to purchase so long as he delivers the goods.

The eighth proposition, that no road is wholly permanent and that it requires continuous upkeep, is intended to impress upon legislators and administrative officials the necessity for making adequate financial provision to care for roads, no matter how costly or efficient their construction. A house is not permanent without repair, a railroad track is not permanent without repair, then why should public funds in a large amount be expended in road construction which, without adequate maintenance, may deteriorate to the extent of 50 per cent in a few years. It would seem almost a reflection upon your intelligence that I should urge upon you these conclusions which are so generally understood and accepted, were it not for the fact that their acceptance is very largely in theory and not in actual practice.

The ninth proposition, that cash is a much more satisfactory form of tax than labor, is put forward as a protest against the continued cherishing of that old heirloom known as "statute labor." If A owes B $10 and B has the option of collecting that $10 in cash or taking the amount out in labor which A shall select and which is totally unfamiliar with the character of work which B requires and which would be semi-independent of any control by B, we should consider it very unsound business judgment if B were to accept the payment in labor instead of cash. If you provide an efficient highway engineer or county superintendent with a modest amount of cash and let him select competent, efficient laborers, he can quadruple the effective results obtained by the same number of laborers under the old statute system. I know that there are sections of country where it is almost impossible to collect a cash tax. A certain amount of discretion might in such cases be entrusted to the county authorities to accept payment in labor.

The tenth proposition, that state agencies which may be used in works of public improvement should be so used instead of in commercial undertakings, is directed partially toward the convict labor question, and is based upon the assumption that offenders against society owe a debt to society which should be paid in such form as will most benefit society, and the further assumption that honest labor should not be discriminated against through the sale or disposal of products created by criminal labor. The practical application of this proposition would mean the employment of convicts in roadbuilding, the preparation of road materials, or in other works of public improvement so far as practicable. This proposition is intended also to emphasize the necessity for correlation of the state's various agencies in the interest of road improvement. For example, a state geologist should be helpful in the selection and location of road materials, the laboratories of state universities should be useful in the testing of materials, the university staff should be helpful

The same road after improvement. Photo by the U. S. Office of Public Roads.

in the giving of theoretical instruction and in many cases in practical extension work, state bureaus of statistics and agriculture should be helpful in accumulating essential data for the road improvement work in the state, and state civil service commissions should be of very great use in the inauguration and conduct of the merit system in the filling of positions requiring technical or practical qualifications and experience.

The subject of road economics is entirely too far reaching to be adequately treated in one paper, and I consider it more advisable to present to you these fun-

damental considerations than to attempt a hurried and general treatment of the whole subject. You can readily see that under the first division of the subject as I have outlined it, there yet remains a great field for analysis and discussion in the detailed application of systems of finance and taxation and in the organization and working policies of highway departments for state and local work. These, I trust, may be dealt with in due time by others, although I may say that it is my purpose to pursue the subject further as one of the projects of my division in the United States Office of Public Roads.

The second division of the subject to which I referred briefly in the opening paragraphs of my paper and which relates to the efficient and economical management of the actual work of construction is important enough for a separate paper. I have pointed out a few examples to show you what this division of the subject comprises, but it is manifestly impossible for me, in the space allotted, to take up the second division even in a general way. The time is last coming, however, when only those contractors and those officials and engineers in charge of force account work who devote attention to the economies of actual construction can obtain material success.

Road Building Outlook in the South for 1915

EARLY in the new year the editor of Southern Good Roads wrote letters to the highway authorities of every Southern state and of some other states, asking about road building prospects for 1915. He had been told that the financial depresion, brought about by the European war, would lessen road expenditures in 1915 and was prepared to believe it.

The answers to these letters, however, told another story. Practically every Southern state will spend as much in 1915 as in 1914 and many of them will spend a great deal more. Below are given a few extracts from some of the letters received:

South Carolina.

Mr. E. J. Watson, commissioner of agrieulture of South Carolina, writes as follows: "There seems to be just now a general determination in South Carolina to take a forward step in the matter of public highways at the coming session of the General Assembly. I am going to make every possible effort to get an intelligent State Highway Commission, and an automobile tax, state-wide in character, with the proper registration system and to provide for a state-wide patrol system of maintenance of earth roads on all the main lines of public highways in the state. There seems to be sufficient sentiment now to get this forward step taken, and certainly no effort will be spared toward that end.

"This year the expenditures for the state at large have been about the same as usual, about one million dollars, but there is this difference, in many sections attention has been given to broadening highways, and to better permanent building. In fact, very great headway has been made this year in this regard. The expenditures for 1914 were probably also about one million one hundred thousand, and if plans do not miscarry by the end of the year 1915 South Carolina should have more well-built and properly maintained highways so far as mileage is concerned than ever before in her history."

Kentucky.

Mr. Robert C. Terrell, commissioner of public roads of the Commonwealth of Kentucky, writes:

"The general outlook for road work in Kentucky is decidedly good, since the passage of the State Aid Act by the General Assembly of 1914, which creates an annual state road fund of about $600,000 which is to be duplicated by the counties, and all of this to be expended annually on construction or reconstruction of roads of the intercounty seat highway system.

"This work will begin in 1915, and therefore I state that I believe the outlook is good. I estimate that $2,900,000 will be expended during 1915 for maintenance, construction or reconstruction of roads in the state of Kentucky. Doubtless between five and six hundred miles of roads will be constructed or reconstructed during 1915.

"There will be something like $1,200,000 more spent during 1915 than there was spent during 1914 on maintenance, construction or reconstruction of roads."

Georgia.

Dr. S. W. McCallie, state geologist of Georgia, says:

"The general outlook for highway improvement in Georgia this year will, I should say, be about the same as last year. The total expenditure for 1915 will probably not fall far short of five millions of dollars ($5,000,000) regardless of the low price of cotton."

North Carolina.

Dr. Joseph Hyde Pratt, state geologist of North Carolina, writes:

"The road outlook is better than ever before in North Carolina, and the chances are that there will not be more miles built in 1915 than in 1914, but that the money spent for road work will be more wisely and economically used."

Dr. Pratt enclosed with his letter some interesting statistics showing money spent on roads in North Carolina during 1914, as follows:

Special Tax	$1,500,000.00
Bond Issues $4,865,000.00 of which about one-half was expended	2,430,000.00
Value of Convict Labor (1800)	360,000.00
Value of Free Labor	800,000.00
Private Subscriptions	100,000.00
Total	$5,190,000.00

Money estimated to be available for road-building in 1915:

Special Tax	$2,000,000.00
Bond Issues	3,000,000.00
Value of Convict Labor (About 2,000 men)	400,000.00
Value of Free Labor	800,000.00
Private Subscription	50,000.00
Total	$6,250,000.00

Virginia.

Mr. C. B. Scott, assistant state highway commissioner of Virginia, writes:

"During the past year, ninety-five out of the hundred counties in the state applied for state aid for the construction of roads and bridges, and 402 roads were constructed and 91 bridges. Ninety-seven out of

the hundred counties have applied for state aid for the coming year.

"The State Highway Commission has no connection with the maintenance of the roads or bridges after completion, and that work is done by the local road authorities. During the coming year, we will probably construct between 700 and 800 miles of road.

"The expenditure during the next year will probably be about the same as during the past year, as the only variation in the regular appropriation will be in the automobile tax and county bond issues. During the past year there was expended approximately $1,770,000 in the construction of roads and about $230,000 in the construction of bridges. We have in addition to the various appropriations and bond issues from 1600 to 1700 prisoners engaged in road construction."

Mississippi.

Mr. E. D. Gunning, chief clerk of the department of agriculture and commerce, of Mississippi, says:

"Replying to your esteemed favor of recent date, making inquiry about road conditions in Mississippi, beg to say that the road situation in this state shows very gratifying results.

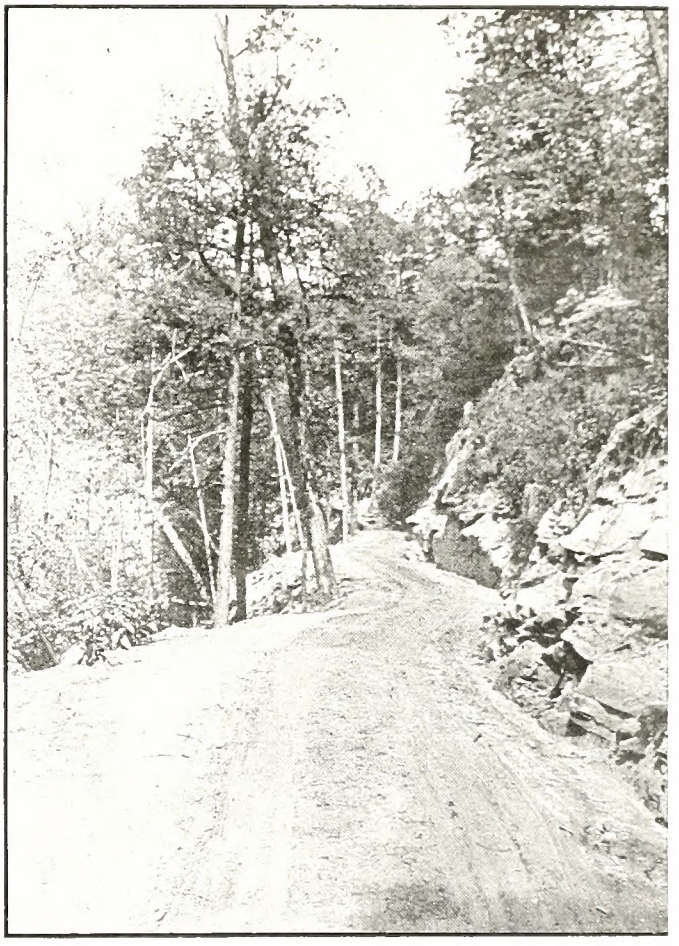
"Eight years ago there were only 12 counties in the entire state with any improved road whatever, all the others working under the antiquated 'Overseer System,' or, perhaps more aptly, 'Overseer Lack of System.' Today, there are only 11 out of 80 counties still working under the old system. The Commissioner of Agriculture, Hon. H. E. Blakeslee, has been untiring in his efforts to awaken the state to the possibilities and advantages of good, permanent roads, and it is largely the result of his various campaigns that the Good Roads idea has spread over practically the entire state.

"Some counties have taken up the Contract System of working roads, under which certain mileage is let to a contractor, which he grades, drains and keeps in repair, for a certain consideration per annum, and the work has to be inspected and approved before payment. While this system has been a great improvement in many counties, still it lacks permanency, and the permanent, surfaced road is the goal toward which all progressive counties are striving.

"Since 1911, various counties have issued bonds, to a total of over $5,000,000.00, and proceeds of which have been used for grading, draining and surfacing roads with gravel, macadam, novaculite, crushed stone, etc., and as a result over 600 miles of permanent highway has been completed, with more under construction. Hinds county, with bonds of $500,000.00 and 100 miles of gravel road completed, and Lauderdale county, with bonds of $420,000.00, and about 80 miles of completed road, possibly the best in condition as a whole, of any in the state.

"Owing to market conditions of bonds, and the effect of the European war on crop prices, it is not likely that so much will be spent during 1915 as in the past two years. However, several notable projects have been planned for, and are being enthusiastically promoted, for instance, a Cross-State road, running east and west from Meridian on the Alabama line through Jackson to Vicksburg, at the Louisiana line (part of the links of which are already completed), and two north and south highways, one running from Memphis, Tenn., through Jackson, on to New Orleans, La., and another entering Mississippi near Corinth, running through Meridian, and on to Biloxi, Miss., on the Gulf Coast. Of course, it will take time and the co-operation of the interested counties to make this possible, but this end is being striven for. Many interior counties have built from five to fifty miles of permanent highway, and there is a strong sentiment growing for more and more of this brand of road. Where this road is once used, those living upon and using it, could not be persuaded for any consideration to live upon the old type dirt road, for the 'quick trip, no-slip, big loads over all-weather roads' idea has gained such a hold, that property values along the improved surface highways have risen from 100 to 500 per cent, depending on the distance from nearby large towns.

"Mississippi is awake to her possibilities not only along the line of good roads, but better market facilities, crop diversification, and the 'Live at Home' idea, which has its impetus from the 'Grown in Mississippi' Association. You have possibly learned of the activities of this 'Grown in Mississippi' Association, and if you are interested in the work it is doing, we will take great pleasure in sending you a mass of information upon this subject and an outline of what the work is accomplishing in this state. We feel that the work is worthy of emulation by other states, and some, particularly Arkansas, Louisiana, and one or two western states, are already at work along lines similar."



Showing a few of the difficulties in building roads in the mountains.

Louisiana.

Mr. Chas. F. Wood, secretary of the highway department, Louisiana State Board of Engineers, writes as follows:

"This department has no figures on hand showing the amounts expended in road construction and maintenance by local authorities exclusive of this depart-

ment, and the following figures are based on the highways constructed with State Aid and under the supervision of the State Highway Department.

"During the year 1914, ten parishes applied and received State Aid in the construction of 132.68 miles of improved earth, gravel and shell highways. These highways are estimated to cost $400,000.00, of which $319,949.89 has already been expended.

"The Highway Department now has on file, applications from fourteen parishes applying for state aid out of the funds for 1915, in the construction of approximately 420 miles of highways. Surveys of about 300 miles of these highways have already been made, and are being made at the present time, and maps, plans, profiles, etc., are being compiled as rapidly as possible.

"It is estimated that approximately 200 miles of highways will be constructed under the supervision of the Highway Department during the year 1915. These projects are estimated to cost nearly $600,000.00. A large percentage will be of gravel construction, and nearly all of them will have reinforced concrete bridges and culverts.

"The Highway Department has held that the question of maintaining State Aid Highways after construction is just as important as construction, but due to the limited funds at the disposal of this department, action on this important question has been postponed in the past, the department depending upon the local authorities to maintain State Aid Roads after construction.

"Experience has shown that the local authorities, can not, except in rare cases, be depended upon to maintain these highways, and the highway department has decided to set aside a portion of the 1915 highway fund for this purpose. Aid will be extended to parishes in maintaining their roads in practically the same manner as aid is now extended in construction work.

"It is impossible to estimate the amount that will be expended in this manner, at this time, but it is hoped that the department will be successful in keeping State Aid Highways in first class condition at all times."

Road Work in Yancey and Madison Counties, N. C.

A news dispatch from Asheville tells that County Commissioner R. G. Buckner has just returned from a trip through Yancey and Madison counties, during which he inspected the roads of those counties and was told of what the counties propose to do during the next few months.

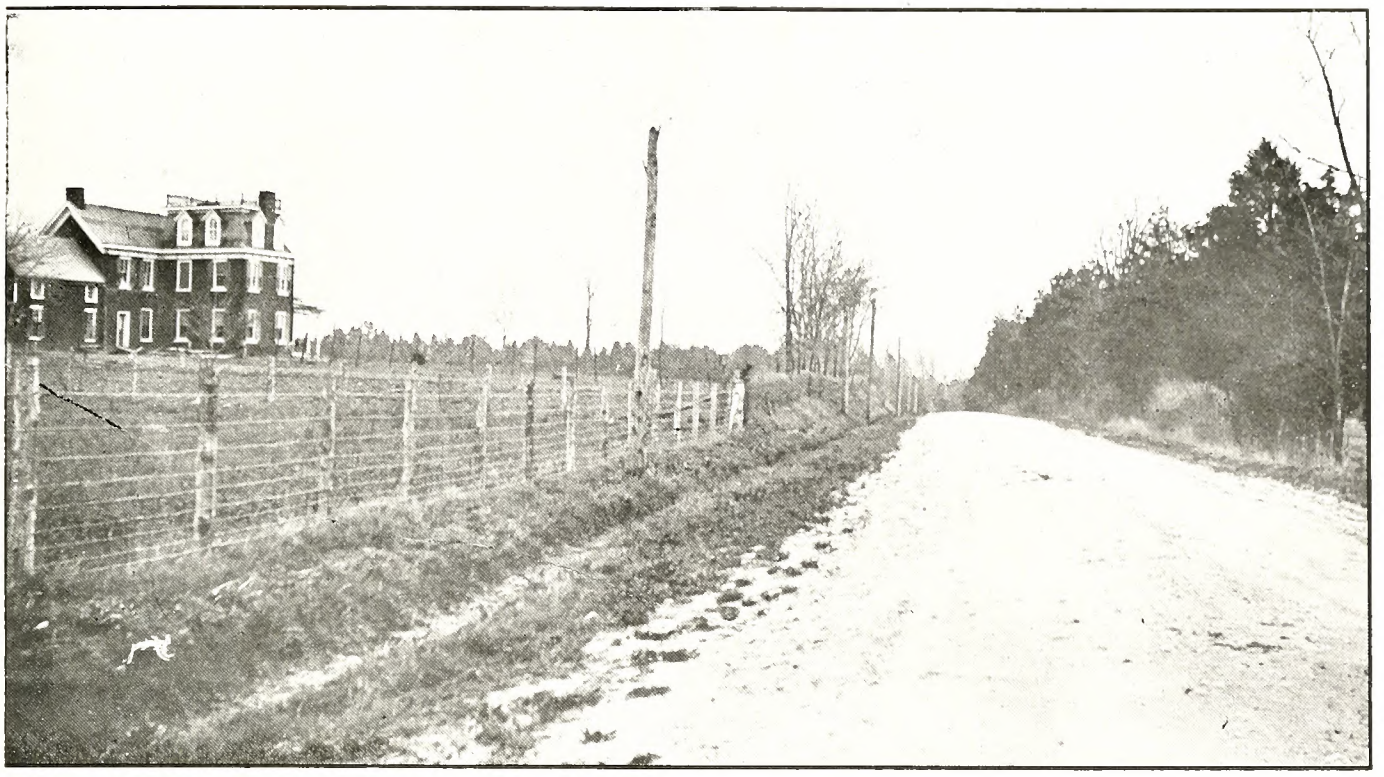
In Yancey county, a road has been built from Burnsville to Micaville, a distance of about six or seven miles, the road running near Toe river. The road is being built in the direction of the Madison county line and is only about two or three miles from that county line. The road will be 40 feet wide, well graded and drained and Yancey county will spend $140,000, which was recently issued in bonds, all of which will be spent on the county roads.

While Yancey is doing all of this work, Madison is also lining up on the road question, having only recently established a chaingang for the first time in its history. Madison will meet the Yancey road at Ivy Gap, having already built three or four miles down Middle Fork to West Fork and within one mile of Mars Hill. The road goes on down Middle Fork to Ivy postoffice, towards Democrat, and is now within three miles of the Buncombe county line.

Madison county is working the road between Marshall and Mars Hill and three forces of men are now at work on this road.

When this work is finished, Mr. Buckner says a delegation will appear before the Buncombe county commissioners and request that this county meet the Madison county road at the county lines.

A Beautiful Home on Five Forks Road, Spottsylvania County, Va., before the road was improved.



Same road in Spottsylvania County, Va., three years after the old mud road was replaced with an up-to-date gravel highway. The road is in keeping with the handsome home on the left.

50,000 MILES OF NATIONAL HIGHWAY WILL

Serve directly 60,000,000 people or 66 per cent of the total population.
Serve in adjoining counties 24,000,000 people, or 26 per cent of the total population.
A total of 84,000,000 people, or 92 per cent of the total population.
Traverse 393 Congressional districts, or 95 per cent of the total.
Serve direct or adjoining 2,471 counties, or 84 per cent of the total.
Reach and connect every large and important city.
Connect every capital of ever State with the National Capital.
Form only 2 1-2 per cent of our total road mileage, but include all main routes.
Carry 50 per cent of our total road tonnage, estimated at 5,000,000,000 tons, at a saving of more than $3,000,000,000 per annum in carrying charges.
Costs less than $1,000,000,000 to build; this cost will be saved several times per annum. Can be completed in ten (10) years.
Accentuate road building and improvement by States, counties and towns.
Raise the standard of road building and maintenance by all communities.
Provide steady employment for all idle and unemployed.
Provide remunerative employment for delinquents and materially improve their condition, besides aiding them toward re-establishment in the community as desirable citizens.
Add to the annual increase of our national wealth not less than $300,000,000.
Save annually in wear and tear of vehicles not less than $500,000,000.
Increase land values adjacent to such highways over $600,000,000.
Increase the prosperity of the farmer more than any other improvement.
Reduce the cost of living more than most any other factor.
Provide better social conditions in the rural communities and thus elevate their intelligence and their moral well-being.
Make rural life more attractive, facilitate intercommunication, and thus reduce migration to cities and encourage the movement "back to the farm."
Enable the building of rural schools and thus reduce illiteracy.
Increase travel throughout the country, inducing people to "See America First," thus keeping home annually more than $250,000,000.

In other words—

Favor, foster and further the development of Our Country
In the length and breadth of these United States of America
By securing the benefits,
Social, moral, commercial, industrial, material, educational and personal
In the progress and uplift of the American people
Which follow in the train of easy intercommunication and transit
Between the great centers of population and distribution
And the great rural productive areas of the nation,
And thus bind the States together in a common brotherhood,
And thus perpetuate and preserve the Union—National Highways Association.

The commissioners of Crittenden county, Ark., will construct a viaduct 2½ miles long, from the Harahan bridge across the Mississippi at Memphis to St. Francis levee, to cost $350,000.

State Control of Road Construction

By A. N. JOHNSON

Bureau of Municipal Research, New York City

THE control by the state of road construction has grown from zero in 1893 to a widespread policy among the states, varying much in degree and method of application; from extensive control extending even to supervision over the smaller political units, to concern only with a few highways in whose construction the state is directly financially interested. Between such wide limits there exist almost all degrees of state interest.

Before entering upon any discussion as to the merits of the policy of state control of highway construction, it is perhaps well to make a brief summary of existing conditions. For this purpose a study has been made of the road laws, advantage being taken of summarized statements where they existed or were at hand for consultation. It may, therefore, happens that in some details of the table herewith presented there may be some slight error, due to the interpretation from the road law itself to the summary, and also the interpretation placed upon the summary. However, as the purpose of this table is merely to give a general view of conditions which would not, therefore, be seriously modified by any slight error, it was not thought of sufficient importance to take the large amount of time that would have been necessary to check carefully this table against the text of the road laws themselves. In the main it is believed to be accurate and for the purpose devised, trustworthy. Some analysis and explanation of the table will aid in its interpretation.

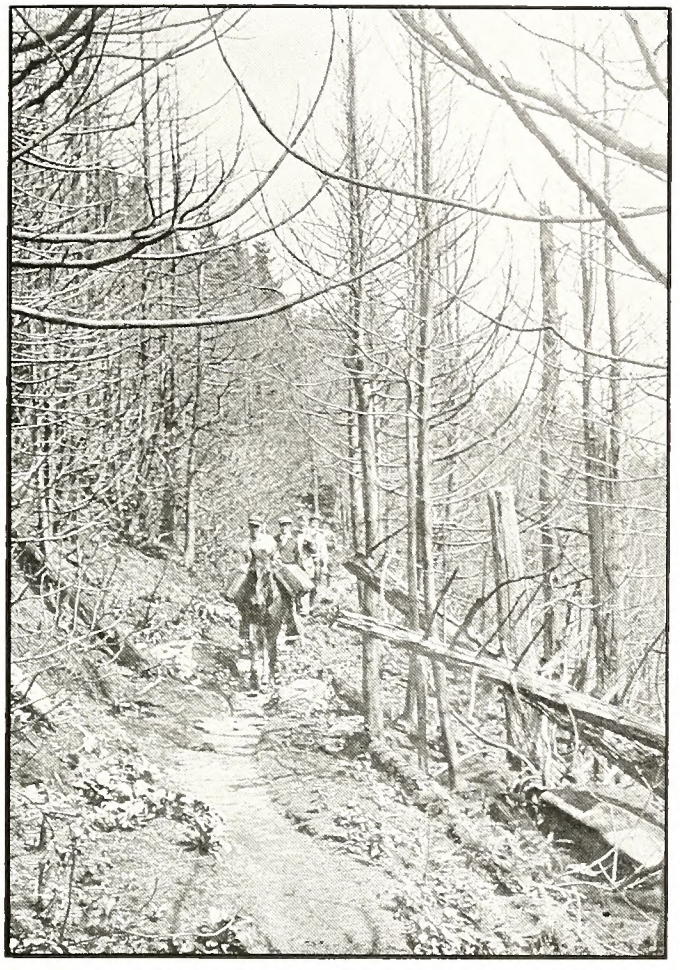
The states have first been checked in regard to the existence of a state highway department. Checks have been made in divisions under this general heading showing whether a state has highway commissioners and a state engineer, or both. Under the heading "commissioners" the states have been checked to show whether the commissioners are appointed or elected, whether any qualification is required, whether any members of the commission are ex officio members. Under the state engineer it is noted whether he is an appointive or an elective officer and whether any qualification is required.

The next main division is state aid roads. By state-aid roads is meant specific sections of roads for which the state pays some portion of the cost, and exercises direct supervision in their construction, as contrasted to a few instances where the state pays the towns certain money to assist in the construction of their roads in general. Under state-aid roads it is noted whether the construction is controlled by the state, and whether maintained by the state or by local authorities. Also, whether they are paid for entirely by the state, by the state and county, by the state, county and town, and whether the land owners of abutting property pay any portion of the cost. The relation of the state to other

STATE CONTROL OF ROADS

STATE	STATE HIGHWAY DEP'T: COMMISSIONERS: APPOINTED	ELECTED	ANY QUALIFICATION REQUIRED	EX OFFICIO MEMBERS	STATE ENGINEER: APPOINTED	ELECTED	ANY QUALIFICATION REQUIRED	STATE AID ROADS: CONSTRUCTION CONTROLLED BY STATE	MAINTAINED BY STATE	MAINTAINED BY LOCAL AUTHORITY	PAID FOR: STATE	STATE AND COUNTY	STATE COUNTY AND TOWN	STATE COUNTY TOWN OR OWNERS	OTHER ROADS: CONTROL: ADVISORY BY STATE	SPECIFIC BY STATE	LOCAL ONLY	LOCAL ENGINEERS REQUIRED BY LAW: APPOINTED BY: LOCAL AUTHORITIES	STATE DEPT	QUALIFIED BY STATE	CONTROLLED BY: STATE	LOCAL ONLY	PAID FROM: COUNTY OR TOWN TAXES	TOWN WITH COUNTY AID	LOCAL TAXES WITH STATE AID	REMARKS
ALABAMA	—			—	—			—				—			—		—						—			
ARIZONA	—				—		—	—							—		—									
ARKANSAS	—				—										—		—									
CALIFORNIA	—			—				—	—		—				—		—						—			
COLORADO	—		—					—		—		—			—		—						—			
CONNECTICUT	—							—	—		—	—			—		—	—								
DELAWARE	—							—				—					—	—		—	—				—	
FLORIDA																	—								—	
GEORGIA																	—									
IDAHO	—			—	—			—	—			—					—	—		—			—			
ILLINOIS	—				—		—	—	—			—			—		—						—		—	* Stone prepared by convicts
INDIANA																	—						—			
IOWA	—			—	—											—		—					—			
KANSAS					—										—								—			
KENTUCKY	—		—												—			—		—		—				
LOUISIANA	—				—		—	—	—			—					—						—			
MAINE	—		—		—		—	—	—		—	—					—						—			
MARYLAND	—		—		—			—	—		—	—					—						—			
MASSACHUSETTS	—				—			—	—		—		—		—										—	
MICHIGAN		—						—				—			—								—			
MINNESOTA	—				—		—	—		—		—			—								—			
MISSISSIPPI																	—									
MISSOURI					—		—	—		—				—	—			—				—	—			
MONTANA	—		—	—	—			—		—		—			—							—	—			
NEBRASKA					—			—							—								—			
NEVADA					—			—				—						—				—				Convict labor only
NEW HAMPSHIRE	—							—	—		—	—					—						—			
NEW JERSEY	—			—	—			—	—	—	—	—					—	—				—	—			
NEW MEXICO				—				—	—		—	—				—							—			
NEW YORK	—							—	—		—	—			—											
NORTH CAROLINA	—				—			*				—			—								—			* Convict aid only
NORTH DAKOTA	—			—	—			—																	—	* Automobile tax prorated to county
OHIO	—							—	—		—	—		—	—		—					—	—			County engineer elected
OKLAHOMA	—		—		—			—							—		—			—		—	—			
OREGON				—	—			—	—		—												—			
PENSYLVANIA	—				—			—	—		—	—				—							—			
RHODE ISLAND	—							—	—		—												—			
SOUTH CAROLINA												—					—						—			
SOUTH DAKOTA	—							—							—								—			
TENNESSEE																	—						—			
TEXAS																	—						—			
UTAH				—	—			—				—			—								—			
VERMONT	—							—	—				—				—						—			
VIRGINIA	—		—					—	—			—					—						—			
WASHINGTON	—			—				—	—	—	—	—					—			—			—			* County engineer elected
WEST VIRGINIA	—			—				—		—		—					—			—			—			State may furnish work, brick, etc.
WISCONSIN	—			—	—			—	—			—					—			—	—		—			
WYOMING					—			—	—		—						—						—			
TOTAL	31	1	7	14	27		6	34	21	7	15	26	2	2	24	3	17	15		5	2	10	39		5	

than state aid roads is shown by the control exercised by the state, whether advisory or specific, that is, the state exercising by law definite supervision or whether the roads are entirely under local officials' control. The existence of local highway engineers is also noted, whether they are appointed by the local authorities or by the state department, and whether there is any qualification required on the part of the state; again whether their actions are controlled in any way by the state or are under the control of local officials only.



Along the trail to the summit of Mount Mitchell, the highest peak east of the Rocky Mountains.

The source of money expended upon the roads is noted, whether from county or township taxes, whether, where townships exist, there is any provision for county aid to the township; also whether local communities receive any aid from the state to assist in the maintenance and construction of their local roads in general.

Some of the facts to be noted from this table are: that there are but seven states without state highway departments. There have thus been created in the past twenty years thirty-six state highway departments. Of these thirty-six states it is to be noted that thirty-four have sate-aid roads, that is, specific pieces of road which are constructed in part by state funds; five of the state highway departments have no commissioners, only a state engineer; while fifteen have state commissioners and no state engineer. It is thus seen that a majority of state highway departments are organized with a commission and state engineer.

The state highway commissions are appointed in part or in whole in thirty-one states, while in fourteen the state highway commissions include ex officio members. In but one state is the highway commissioner elected, and in seven only are any qualifications required. In twenty-seven the state engineer is an appointive officer. In no state is an elective officer, but in six only are qualifications required. Where any qualifications are required for the position of state engineer they are for the most part among the recently enacted state highway laws. State highway legislation could be much bettered, if qualifications were required in all the states where state engineers exist but it is at least some satisfaction that the state highway engineer is in no state an elective officer.

In the states where state-aid roads are built, it is to be noted that the construction is controlled by the state in thirty-four instances. In twenty-one instances the state-aid roads are maintained by the state, that is, the state exercises immediate supervision and control of the maintenance, although the expense of the maintenance may not be in each instance fully at the cost of the state. In the remaining instances the control of the maintenance is in the hands of local officials. As it was a number of years before any state save Massachusetts exercised control over the maintenance of the state-aid roads, the large proportion that now do take charge of this important function shows a greater realization of the importance of maintenance of the state-aid roads by a central control, and where states are contributing funds towards any considerable mileage, they must soon realize the absolute necessity of state control of the maintenance of these roads if the service that state-aid roads should render the public is to be secured and the investment made by the state in their construction conserved.

At the summit of Mt. Mitchell. The picture shows the monument of Prof. Elisha Mitchell, for whom the mountain was named. The monument was destroyed recently either by vandals or by the wind.

The method of paying for state-aid roads varies in different states, and it varies for different roads in the same state. Some states, for example, have a certain system of highways for which the state pays all the cost, while on another system of roads the state and county divide the cost. There are fifteen states in which the state pays the total cost on state-aid roads, although some of these states also share with the county or town in the construction of other state-aid roads. There are twenty-six states in which state-aid roads are built by the aid of the state and county, two in which the state and town are contributors; also but

two in which any assessment of the cost of the state-aid road is borne by the adjoining property. It is thus seen that most states consider that state-aid roads should not be paid for by assessments on adjoining property.

The control by the state over other than state-aid roads has been a recent development and its origin may probably be traced directly to those states which began their state road work by the organization of a commission to study and report on conditions before undertaking definite expenditures for state-aid roads. This was first undertaken in Maryland, and the law provided that the state could advise with local authorities as to the construction of their roads and bridges, and the work of the Maryland highway department demonstrated that there was much to be gained by advisory supervision on the part of the state. Such work has been done by a number of states only to a greater degree, notably, in Illinois, Wisconsin and Iowa. The work in these states at first was advisory only, that is, the local authorities co-operated with the state departments voluntarily, the law not requiring that they should necessarily follow the advice given by the state. But the remarkable success of this work, the widespread influence it exerted after a few years of activity, the hearty co-operation on the part of many local officials, and compulsory co-operation through public opinion on the part of others, demonstrated conclusive-

A very bad road near Petersburg, Va., before improvement.

ly the wisdom and the need for definite control by a state highway department over the activities of local road officials.

Today advisory control is exercised by state departments in twenty-three states and definite control already exists in three.

Perhaps the greatest significance attaches to the fact that there are fifteen states in which local highway engineers are provided for by statute. This is in considerable contrast to the opinion that road work could be done by anybody and did not require any skilled supervision. But the fact that in no more than a third of the states are local engineers required by statute shows that the appreciation of skilled control has not spread to the extent that it should. The work that has been accomplished by the highway engineer in the past ten years in this country has demonstrated beyond further argument the need for such control.

The reason for a policy of state control of road work that exists in so many states, and is increasing, will be found in the demand of the people generally in all parts of the country for better highway service. Highway transportation has become an increasing factor in economic development, and with its increasing importance there is demanded better transportation facilities of the highways. This necessitated that the highways should be given better attention and different treatment than had been the practice. The problem of highway development is realized to be of general concern, not merely local. The interests of one locality in this problem is no longer confined to the roads immediately adjoining, with the result that it has been manifest that a larger unit of control than a town or county would be necessary if the development of the highways was to be such as would make it possible for them to render the service the public demands. There has, therefore, grown, as we have seen, an increasing control by the state over the local communities in the matter of road building, and as a broad policy, resting as it does on sound economic conditions, it is not only wise, but inevitable; and that it is practical has already been demonstrated by the work done in many states. Among these may be mentioned notably Massachusetts, Connecticutt, New York, Illinois, Wisconsin and Iowa.

Perhaps the most interesting study of state control is to be had from an examination of the Iowa law and its practical application. In Iowa the state highway department spends no money on state-aid roads but it is concerned solely with the direction and supervision of the taxes raised by the local communities for expenditure upon their highways.

The work done in many states, particularly in Illinois, has demonstrated the efficiency of road construction by day labor. As carried on in Illinois, the state furnished the skilled supervision and the more expensive machinery, the locality, the labor and teams. There is a two-fold benefit gained by handling the work in this manner—the quality of the work is superior to contract work, or perhaps, a fairer statement would be, the quality of the work desired is more readily obtained, and is done at a cost to the community less than it could be done by contract. Where state control of road work exists and extends into the concerns of the smaller units, it is possible for a much greater variety and amount of work to be handled by day labor, than would be at all wise or practicable if the skilled supervision that the state highway department can furnish the localities could not be obtained.

What has been realized from state control of road work may be thus summed up: The development of a system of main highway adapted to modern motor freight traffic which promises such great economic changes in both rural and urban life, increasing the efficiency of local road officials in the expenditure of the local taxes by preventing useless undertakings, by suggesting economic forms of construction and by increasing the economic service of the highways by concentrating expenditures on important roads and preventing waste on unimportant ones; the prevention of numerous accidents and fatalities by the construction of safe bridges and elimination or treatment of railroad grade crossings in such a manner as greatly to lessen the danger from them. And experience has demonstrated that these ends are accomplished by state control of road work and only by such control.

Good Roads Commission Urged For Nebraska.

Appointment of a state good roads commission was urged by W. S. Garheart of Kansas in an address before the good roads section of organized agriculture meetings at Lincoln, Neb., Jan. 20. Mr. Garheart is state engineer of Kansas.

The speaker said that most of the road laws of western states were totally unfit.

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Virginia Road Builders' Association

Organized Nov. 23, 1911

THE OBJECT OF THIS ASSOCIATION IS TO DEVISE THE MOST EFFICIENT METHODS AND APPLIANCES FOR ROAD BUILDING AND MAINTENANCE.

EXECUTIVE COMMITTEE

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Richmond, Va.

Maj. E. H. Gibson
Culpepper, Va.

B. W. Hubbard
Forest Depot, Va.

C. B. Scott
Lynchburg, Va.

Through the courtesy of the publishers of SOUTHERN GOOD ROADS this page each month will be devoted to the interests of the Virginia Road Builders' Association. It is hoped that the members of the Association will feel free to make use of it. All communications should be forwarded to the Secretary.

By order of the Executive Committee.

F. D. HENLEY, Secretary

ARTICLE III. CONSTITUTION

MEMBERSHIP

Section 1. The membership of the Association shall be composed of all persons interested in road building in the State of Virginia who shall make application to the Secretary and pay the annual dues for one calendar year in advance.

ARTICLE I. BY-LAWS

Section 1. The annual dues shall be one dollar and shall be payable in advance.

The Virginia State Road Builders Association will hold its fourth annual convention at Richmond, Feb. 9 and 10, when superintendent of public instruction, R. C. Stearnes will talk on "Road Improvement and the Public Schools;" Col. Gregory of Mecklenburg on Co-operation of County and State;" eGo. P. Coleman, highway commissioner, on "Road Laws and Legislation;" Maryland's chief engineer, H. C. Shirley on "Road maintenance;" C. S. Reeve of Washington, Asphalt, tar etc;" Z. G. Durfey, highway commissioner, "Sand-clay and soil roads;" C. N. Snead, Virginia bridge engineer, on "Bridges and Culverts."

Road Maintenance.

The association has made a special effort to get some one to discuss the question of "Road Maintenance" who is qualified to do so, and has been very fortunate in geting Mr. Shirley, chief engineer of the Maryland State Roads Commission, to discuss this topic and it is its object to devote the session in the afternoon of Tuesday, February 9, largely to that subject. It is hoped to have a number of county supervisors and road commissioners present, as well as others who are interested in this subject, in order that it may be thoroughly discussed.

There is probably no subject connected with road improvement in this state that deserves more careful and thorough investigation than that of "Road Maintenance." A number of the counties have issued bonds for road improvement with which they have constructed roads of various types.

"In many cases these roads are not being carefully maintained," said an officer of the association, "and if

Same stretch of road near Petersburg, Va., after improvement. Photo by the U. S. Office of Public Roads.

some steps are not taken in the near future to devise a proper system of maintenanee, the people of these eounties will find that they have lost a larger part of their investment, while they still have the debt ineurred by issuing the bonds.

Should See What Other States Are Doing.

"It would seem wise, with so serious a matter as this before us, that we should aseertain what is being done in the other states, and what is considered the most improved practice in regard to road maintenanee, and then devise a system adapted to the needs and conditions which prevail in this state. In addition to the improved roads which have been constructed in recent years, there is a very large mileage of unimproved or earth roads, which will not be surfaced with either macadam, gravel or other material at any time in the near future, and a large part of the population of the state is served by such roads and it is very desirable that the most efficient methods of maintaining such roads be determined and put in force.

"In order that the large sums of money which are being expended in road construction and maintenance may be economically invested, it is necessary that the forces thus employed be as carefully and systematically organized as those of any railroad or other eorporation, and that the proper reports and aeeounts be made in order that the responsibility for the expenditure of the money and the results obtained be definitely fixed."

The Virginia Road Builders' Association extends a welcome to all persons interested in road improvement, to attend its meetings and take part in its discussions. It is expected that reduced rates will be given by railroads and hotels, and any information desired can be obtained by addressing the secretary of the Association, F. D. Henley, P. O. Box 1056, Richmond.

* * *

In the January issue Southern Good Roads printed a few extraets from the reeent annual report of Mr. G. P. Coleman, state highway commissioner of Virginia Here are some additional faets from the same report:

"During the twelve months, October 1, 1913, to October 1, 1914, the state highway department worked in ninety-six of the one hundred counties of the state, working on 403 different pieees of road and ninety bridges, constructing during that time 855 miles of road, at a eost of $1,767,010. Of this amount, the state contributed $185,000 direct appropriation and $160,000 derived from the automobile tax, these two funds being known as state money aid. In addition to this, the state appropriated $145,000 for the maintenance and support of the convict road force. The remainder was raised by the counties by direct levies or magisterial district and county bond issues.

"The state is at the present time maintaining convict eamps in thirty counties, and is working in these camps approximately 1,100 convicts from the state penitentiary and between 500 and 600 prisoners from the county jails, making a total of 1,600 or 1,700 prisoners who are now employed by the state in road work. The cost of this convict labor to the state per ten-hour working day for the last year was approximately 53 per eent, a small advance over last year.

"I would like to call to the particular attention of the citizens of the state the fact that during the last 8 years approximately $7,000,000 has been expended by the state and counties in road work, building about 2,900 miles of road and several hundred bridges, but that no provision has been made for the maintenance and care of the roads or bridges after their eonstruction, as has been reeommended by this department.

"It has been exceedingly difficult to impress on the local road authorities the necessity for the maintenanee of the roads after they have been eonstructed. I eannot urge too strongly the importance of immediate legislation requiring eounties or districts to make proper provision for the upkeep of their roads, for it is eertainly very short-sighted and very poor business poliey to expend large amounts of money in the improvement and general betterment of the roads and then allow them to go pieces from lack of proper care.

"I would urge that the matter of the necessary road maintenanee legislation be agitated by the citizens of the various counties of the state, and that the members of the new assembly be fully advised of this necessity."

Lecturers at Columbia University.

Among the road experts who delivered addresses before the graduate students in highway engineering at Columbia University, New York, during January are noted the following:

Mr. Walter H. Fulweiler, Assoc. M. Am. Soe. C. E., Chief Chemist, United Gas Improvement Company, Philadelphia, Pa., on January 4th, an illustrated lecture on "Manufacture of Refined Water Gas Tar."

Mr. Philip P. Sharples, Chief Chemist, Barrett Manufaeturing Company, New York City, on January 5th, an illustrated lecture on "Chemistry, Manufacture and Testing of Refined Coal Tars and Methods of Transportation."

Major W. W. Crosby, M. Am. Soc. C. E., Chief Engineer, Maryland Geological and Eeonomic Survey, and Consulting Engineer, Baltimore, Md., on January 11th, a leeture on "Preliminary Investigations in Highway Engineering-Value and Methods Employed."

Mr. William H. Connell, Asso. M. Am. Soc. C. E., Chief, Bureau of Highways and Street Cleaning, Philadelphia, Pa., on January 18th, an illustrated lecture on "Special Features in street Cleaning Work—Snow Removal and Annual Municipal Clean-Up Week."

Lonoke County, Arkansas, Spends $560,500 for Roads.

Lonoke County, Ark., during the last year has expended $560,500 in constructing a completed system of improved roads, and up to date 93½ miles have been completed, acording to the biennial report of Hugh R. Carter, state highway engineer, to W. B. Owen, state highway eommissioner.

"The improvement," says the report, "was aceomplished through eight improvement districts, containing 219,081 acres of some of the best farm lands in our state. This system of roads places every aere of land affected by taxation within three and one-half miles of our improved roads, at a eost of $2.31 per acre, extending over a period of 20 years. All funds were borrowed on bonds bearing 6 per cent interest."

Barbour county, Ala., will bridge Barbour ereek, two miles from Eufaula, on the National Highway, with a steel and eoncrete bridge to eost about $6,000.

Creek eounty, Okla., contemplates the expenditure of $100,000 to bridge Rock creek and Cimmaron river.

New Hanover county, N. C., is planning to build by contract 7½ miles of macadam road.

Parkersburg, W. Va., votes this month on a bond issue of $200,000 for street paving.

A Connected System of Roads for Florida.

Mr. C. E. Foote, the eminent good roads advocate, who has been travelling through Florida for the past few weeks in the interests of the Florida Good Roads Association, is convinced that Florida needs a connected system of highways.

"Touring has not yet begun in Florida," said Mr. Foote. "A few venturesome people have come down here with their cars. They drive over a limited territory in comfort, attempt to go to some other locality and then have engaged ox or mule teams to pull their cars out of the sand or mud. They then have the cars shipped back north by freight; have smiled, praised the climate of Florida and then have gone home themselves.

"A state so eminently fitted for winter touring as Florida, where nature has surpassed itself in providing facilities for physical and mental relaxation from the rigors of severe climate, requires only the application of good sense and good judgment to become available as the winter resort of America, especially for tourists.

"Among the great class of tourists who motor for pleasure, there is always a certain percentage who will stop somewhere, attracted by a location which appeals to them. They may purchase property for a winter residence or discover some advantage which their their friends amy utilize or fix upon some location where health or wealth or comfort can be secured by themselves or their friends.

"It is a mistake to figure on the tourist as purely a pleasure seeker. Many are seeking relaxation and rest and pleasure, pure and simple. Many others, while seeking the same solaces, have a weather eye open for an opportunity for benefit, either to himself or his friends.

"In touring wherever the roads will permit him to go he is likely to make inquiry as to the values of property; the proximity and availability of markets or shipping points; the possibilities for the introduction of new industries or the propagaton of new crops on certain soils and to secure a variety of data which he can digest and classify at his leisure.

"It must be remembered that most touring parties contain at least one successful business man who is accustomed to exercising his intelligence in all commercial matters and who has a clear and broad comprehension of conditions. From off his shoulders the schemes of schemers fall like water from a duck's back, but he is likely to see an opportunity at any turn of the road. A canning factory might be profitable here, a wood pulp plant there, an available area might be used to develop some South Sea fruit or a game preserve might be established for providing fresh game for the outer markets.

"The possibilities are limitless but their greatest exploitation depends on improved roads. Florida has been well advertised. Its beauties and charms of soil and climate have been heralded farther and wider than those of most states. That it possesses those beauties and charms is undeniable. A few fakirs have attempted to make improper use of them, as shown by court records.

"But the fact still remains that the Almighty created a Florida beautiful, a Florida, as its name implies, capable of giving pleasure to the artistic senses of the people of a continent and from a more utilitarian standpoint available for the highest uses of an advanced civilization.

"Only roads are required to develop these advantages. And roads which will reach somewhere can only be directed under state control. County roads and roads which will reach intermediate sections may be matters of local control, but those larger views which are the original inspiration of the tourist, the capitalist, the manufacturer, the settler, the person who will come into Florida with brains, experience and money to take advantage of opportunities must be provided for by main highways over which access may be gained to localities which have not and are not likely to be provided for locally.

"The paramount question unsolved is the elimination of petty and local comparisons. No county or subdivision can be greater than the state. The superiority of one county or its progressiveness over that of the adjoining county should not justify the latter in an interference with the welfare of the state for while one county may have a large mileage of good roads of its own and the adjoining county none and each with the attendant prosperity and lack of it, the slower county under a state control would not be permitted to stand in the way of the more progressive ones.

"The state could build a road through the slow county and make the connection between the progressive ones. Then the slower county would begin to build roads for the accommodation of its own people.

"From a touring standpoint a state control of through routes is necessary."

The Relation of Roads to Rural Schools.

The rural population is more willing to support better schools to-day than at any previous time. It is being realized that all educational activities or agencies must be more or less correlated, and, more than all else, that they must be made accessible to the children. In many counties where bad roads prevail, most of the schools are of the antiquated one-room variety. They are usually located along bad roads, which, during the winter, when the schools are usually in session, become so nearly impassable as to make it difficult for the children to reach them. This condition causes irregular attendance and restricts the educational opportunities of the child. Not only this, but it often impedes the economic consolidation of these smaller schools into larger, stronger graded schools, with high-school courses, directed by a competent principal and corps of teachers, according to the Office of Public Roads.

On the other hand, in counties which have improved their roads the schools are easily reached, the average attendance greater, the efficiency largely increased, and economic consolidation made possible. Regular attendance at school means consistent and regular growth of both school and pupil, and consolidation of schools means a maximum of efficiency at a minimum of cost. It is also noteworthy that there is a marked tendency for the consolidated school to become the social and intellectual center of the community. Most modern rural schoolhouses are so constructed as to serve the community as gathering places for various kinds of public meetings, and where vans are used to convey the children to school during the day they are frequently pressed into service to haul the farmers and their wives to institute work, lectures, or entertainments at the schoolhouse. The consolidated school becomes a sort of community center to which all educational and social activities converge, and in order that it may properly perform that function all of the highways leading to it should be so improved as to render it readily accessible throughout the year.

Quitman, Ga., has available for street improvement $100,000. Contract has been let for 25,000 square yards of asphalt paving.

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DEVOTED TO HIGHWAY AND STREET IMPROVEMENT

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VOL. XI. FEBRUARY, 1915. No. 2.

THE OUTLOOK FOR THE SOUTH.

Last month we told of an investigation conducted by the editor of this publication in regard to the outlook for road-building in the South in 1915. In this issue we offer excerpts from the replies received from state highway authorities in many Southern states in regard to it. To these replies we respectfully direct your attention.

If you have decided that there is to be "nothing doing" in 1915 because of the war in Europe and the low price of cotton, prepare to revise that opinion. As far as the building of roads is concerned, the South will hardly realize that cotton is selling below ten cents, or even that the most terrible war of all the ages is in progress in Europe.

OUR AUTOMOBILE DEPARTMENT.

Recognizing the fact that our readers are interested in automobiles and in automobiling, a very large percentage of them being automobile owners, we have devoted much space to questions of interest to them. We have not, however, been able to satisfy them or to satisfy ourselves along this line and with this issue we are starting an automobile department.

A great many of our readers have suggested this step. Men in whom we have confidence have advised it and we have decided to undertake the additional expense and work that such a department, rightly conducted, will bring.

We want it understood in the beginning that the department is not established for any other purpose than to serve our great host of Southern readers, and especially that very large part of our family who own cars and who are interested in touring their own section before reaching out to other parts of the country.

We especially solicit the interest and co-operation of automobile associations and clubs in all parts of the South. If your section has anything to offer the tourist, write us about it. We will tell your story to every section of the great South.

A STATE HIGHWAY DEPARTMENT FOR NORTH CAROLINA.

As Southern Good Roads goes to press the prospects for the establishment of an effective state highway department for North Carolina, are very bright. A bill has been introduced in the General Assembly by Col. Benehan Cameron, a good roads enthusiast of national reputation. It embodies the very best wisdom of all of the best road builders of the nation and if it becomes a law North Carolina will rapidly take place with the leaders in road building activity in the South.

In the North Carolina department the full text of the bill appears. Every North Carolina reader of this magazine should study the bill carefully and if pleased with it, write to his representative urging him to support it.

The bill has the unanimous endorsement of the North Carolina Good Roads Association.

WORK YOUR SAND CLAY ROADS.

The present winter has been the hardest season on roads that we have experienced for many years. It has been especially hard on sand clay and top-soil roads and there has been a great deal of complaint about the condition of these roads. Especially is this true in communities where the roads were built last summer and fall and had not had time to come to proper form. The unusually long rainy season has caused them to break up everywhere and many a woeful tax-payer is bemoaning the loss of the money that went into the construction of the road.

All is not lost, however bad the roads look. It should be remembered that the man who invented the sand clay road was indicted for "ruining" a public road, after just such a season as this has been, but when spring came and the road dried out, it was the finest road in the county.

If road authorities will exercise due vigilance and get busy just as soon as the weather will permit at rounding up their sand clay and top soil roads, mending worn spots and opening drains and ditches, everything will come out all right. If they do not, they will have no roads.

And it won't do at all to wait until the roads are dry and hard. The time to do the work is while the soil is

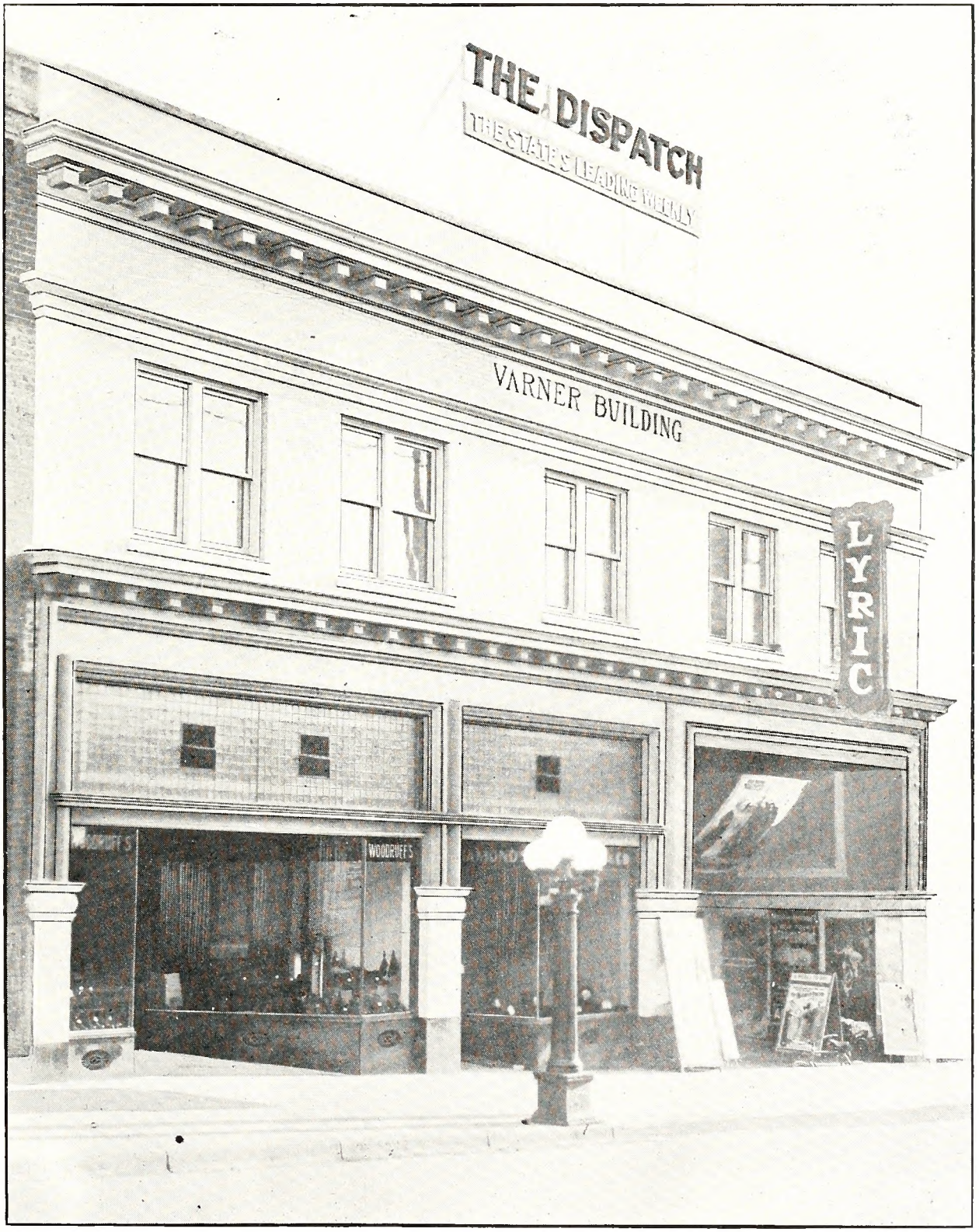
still damp. If you wait until the roads dry out you will find the work of repairing a great deal more expensive and a great deal more difficult.

The Lincoln Highway association of Colorado is planning to rush work on the Colorado division of the Pike's Peak Ocean-to-Ocean road, in time for the heavy tourist travel expected through there on account of the expositions in California.

Delaware is forming plans for a $750,000 bond issue to build a trans-state boulevard, the farmers and motorists working together to place the matter before the legislature, now in session.

The state of Washington will raise over two million dollars by a mill public highway levy.

"Los Angeles county, Col., will spend seven million dollars during 1915 for roads.



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North Carolina Good Roads Association

Good Roads Institute at University of N. C.

The Good Roads Institute which is to be held at the University of North Carolina, Chapel Hill, N. C., Feb. 23-27, is very fortunate in being able to have Mr. C. M. Strahan, Professor of Civil Engineering and Director of the Good Roads Department of the University of Georgia, who will make an address and lead the discussion on "Top-soil and Sand-clay Roads;" in having Mr. W. W. Crosby, Highway Engineer, of Baltimore, Md., and former Highway Commissioner of Maryland, who will make an address and lead the discussion on the subject of "Maintenance of Highways;" and also in having Mr. D. H. Winslow, of the United States Office of Public Roads, now in charge of the maintenance of the Capital Highway, who will describe methods he is now using for maintaining this stretch of highway. Mr. Winslow 's lecture will probably be illustrated.

While the subjects of "Sand-clay and Topsoil Roads" and "Maintenance" will be the foremost discussed at the Institute, other subjects will be given serious consideration; such as, "Bridges and Culverts," especially metallic culverts, "Bituminous Roads," and "Macadam Roads."

The formal opening of the Institute will begin at 2:30 p. m. Tuesday, February the 23rd, but the registration of delegates will begin at 10:00 o'clock on Tuesday mornig.

Professor Strahan's address will be on Wednesday, February the 24th, and Major Crosby's will be on Thursday the 25th. Mr. Winslow will also speak on the afternoon of the 25th.

* * *

Bill for State Highway Commission for North Carolina.

Col. Benehan Cameron has introduced in the General Assembly of North Carolina, now in session at Raleigh, a bill for the establishment of a state highway commission. The bill has the earnest endorsement of the North Carolina Good Roads Association and is here given in full:

Be it enacted by the General Assembly of the State of North Carolina:

Section 1. That a State Highway Commission is hereby established, whose duties it shall be to assist the counties in developing a state and county systems of highways as set forth more specifically hereinafter.

Sec. 2. The State Highway Commission shall consist of the governor, three citizens of the state of North Carolina to be appointed by the governor, one from the eastern, one from the central, and one from the western portion of the state, the state geologist, a professor of civil engineering of the University of North Carolina, and a professor of the North Carolina Agricultural and Mechanical College, said professors to be designated by the governor.

The members of the commission shall be appointed and serve for four years and until their successors are appointed; the members of the commission shall, when employed in any manner required of them under this act receive their actual expenses.

Sec. 3. The Governor shall fill all vacancies in the commission as caused by death or otherwise, and he shall have the power to remove any member for due cause.

Sec. 4. The commission shall appoint a civil engineer well versed in the science of road building and maintenance, who shall be the state highway engineer, whose compensation shall be fixed by the State Highway Commission. The term of office of the state highway engineer shall be six years from the date of his appointment unless removed from office for due cause by the highway commission.

Offices.

Sec. 5. The proper state authorities shall furnish and provide suitable offices for the State Highway Commission in the city of Raleigh, and shall provide it with the necessary office supplies, fixtures, and stationery.

Assistants, Clerks.

Sec. 6. The State Highway Commission may employ such assistants and clerks as in its opinion the needs of the state demand. The salaries paid such assistants and clerks shall be determined by the State Highway Commission.

Duties of the Highway Engineer.

Sec. 7. Upon the written request of the road officials of any county desiring to avail themselves of the services of the highway engineer on the terms of this act, for advice in regard to the improvement of any bridge, road, roads, or sections thereof, the highway engineer shall survey or have surveyed such bridge, road, roads, or sections of road, and shall prepare, or have prepared, such maps, profiles, plans, and specifications as are necessary in his judgment to determine the cost of the proper improvement of such bridge, road, roads, or section of road; and these, together with the estimated cost, shall be presented to the board of county commissioners or other officials in authority, who made the request for such information, at their next regular meeting held after the completion of such surveys and

estimates. If such bridge, road, roads, or section of roads should thereafter be built by the county officials, it shall be constructed according to the plans and specifications as furnished by the highway engineer. In the event that the construction work on any such bridge, road, roads, or section of road is not started within three months after the highway engineer makes his report to the county officials, the county officials shall, and are hereby directed to, reimburse the State Highway Commission for the expense incurred by its office in obtaining the information furnished the county officials. Should, however, the construction be taken up at a later date, the highway engineer, when he takes charge of the actual construction, shall return said amount to the county officials.

The highway engineer, or his duly authorized assistants, shall have entire charge of the location, construction and maintenance of all roads, bridges, etc., constructed under this section.

The state highway engineer shall keep an accurate record of all costs and expenditures of his office. He shall supply technical information regarding roads to any citizen or officer in the state, and shall, from time to time, publish for public use such information as will be generally useful for road improvements. Such publications and his biennial report to the legislature shall be printed at the expense of the state, as other public documents.

State Highway System.

Sec. 8. The state highway engineer shall from time to time make surveys, prepare plans, profiles, specifications, and estimates of the cost of a system of highways connecting by the most direct and practical route, all the county seats and principal cities of the state. He shall make a detailed report to the state highway commission of the mileage and cost in each county. He shall state the type and class of road suitable for each section. He shall give the average number and class of teams which each section of road is at present accommodating, and the probable increase in traffic which would follow improvements as recommended by him.

Location of Roads.

Sec. 9. In the location of roads provided for in sections 7 and 8, the highway engineer shall so locate them as to serve the needs of the people in the immediate section insofar as this would not conflict with such roads being links in the system of highways provided for in section 6 of this act.

Consultation and Assistance From Members of Commission.

Sec. 10. The State Highway engineer may call into consultation, for any engineering problem confronting him, the State Highway Commission.

Sec. 11. The State Highway Commission shall call an open meeting to be held at the office of the county commissioners within each county of the state at least one day in each calendar year, for the purpose of affording instruction relative to matters pertaining to road and bridge construction maintenance, and repairs. Such meeting shall be conducted by the state highway engineer or one of his assistants designated for the purpose by the state highway engineer.

Upon receipt of the notice from the the State Highway Commission, the county commissioners shall call such meeting on the date set by the State Highway Commission, and shall be present themselves and notify the county engiener, the commissioners of each township and the superintendent of each road district within the county to be present at such meetings, in person. Each of the county, township and road district officials above mentioned shall be paid the regular per diem allowance, in the usual manner, for the actual time in attendance at such meetings.

The members of the commission when employed in any manner required of them under this act shall receive their actual expenses.

Sec. 13. That the sum of $30,000 annually, or so much thereof as may be necessary, is hereby appropriated out of any moneys in the treasury not otherwise appropriated for the porpose of carrying out the provisons of this act.

Sec. 13. That all laws and clauses of laws in confliet with the provisions of this act are hereby repealed.

Sec. 14. That this act shall be it force from and after its ratification.

* * *

It is announced that Mr. W. C. Boren, chairman of the board of county commissioners of Guilford county, will go to Atlanta in a few days to investigate the new road work that is being done by Fulton county. There they are experimenting with a concrete road base similar to the foundation for city streets. Mr. Boren thinks that something of this kind must be adopted by counties in this state in road building. Guilford county has over half a million dollars invested in macadam roads that are going to pieces by reason of not having a binder. The problem here is becoming a serious one. Taxpayers are loud in their protests against the present system of road building. They feel that they are not getting their money's worth. Mr. Boren hopes that the county will be able to find some economical substance that will hold the roads together.

Carriage Builders Were Pioneer Good Roads Advocates.

The very successful convention of the American Good Roads Congress, held in Chicago, Dec., 14th to 18th, calls to mind the fact that the first organization of national importance to advocate seriously the construction of better highways was the Carriage Builders' National Association, whose first meeting was held in New York in the autumn of 1872. At this meeting a committee was appointed whose business it was to study the road question and make such recommendations for betterments of highways as seemed expedient. This committee has been continued without an intermission during the 43 years taht have passed since that meeting was held, many of their recommendations having been carried into effect to the immense improvement of the roads and the consequently more rapid growth of the vehicle industry.

Contractors Keen for Road Work in Maryland.

"Perhaps the most satisfactory lot of bids we have ever received," was Chairman Weller's characterization of the proposals opened last month by the State Roads Commission for a number of contracts to be awarded in the near future. One of these contracts is for two spans of the new Hanover street bridge between the Baltimore county and Anne Arundel county shores.

In many instances the bids ran several thousand dollars under the estimates made by the chief engineer of the commission. The competition was very keen, and Mr. Weller feels certain that by letting the bids at this season of the year, instead of waiting until work can be resumed in the spring, many thousands of dollars will be saved to the state.

The lowest bid on the bridge was $11,000 under the estimates of the engineers.

Methods of Retiring Rural Highway Bonds

In a recently issued bulletin of the United States Department of Agriculture, entitled, "Highway Bonds," the specialists of the Office of Public Roads, in collaboration with Professor James W. Glover, of the University of Michigan, discuss in detail the various methods by which a community, having issued bonds to pay for highway improvements, can most easily meet those bonds at maturity. The sinking fund, annuity, and serial bond plans are discussed at length, with elaborate interest and amortization tables, which will enable the county commissioners to determine easily the amount of money that must be raised yearly, as well as the total cost of any given loan.

The following is a summary of some of the conclusions:

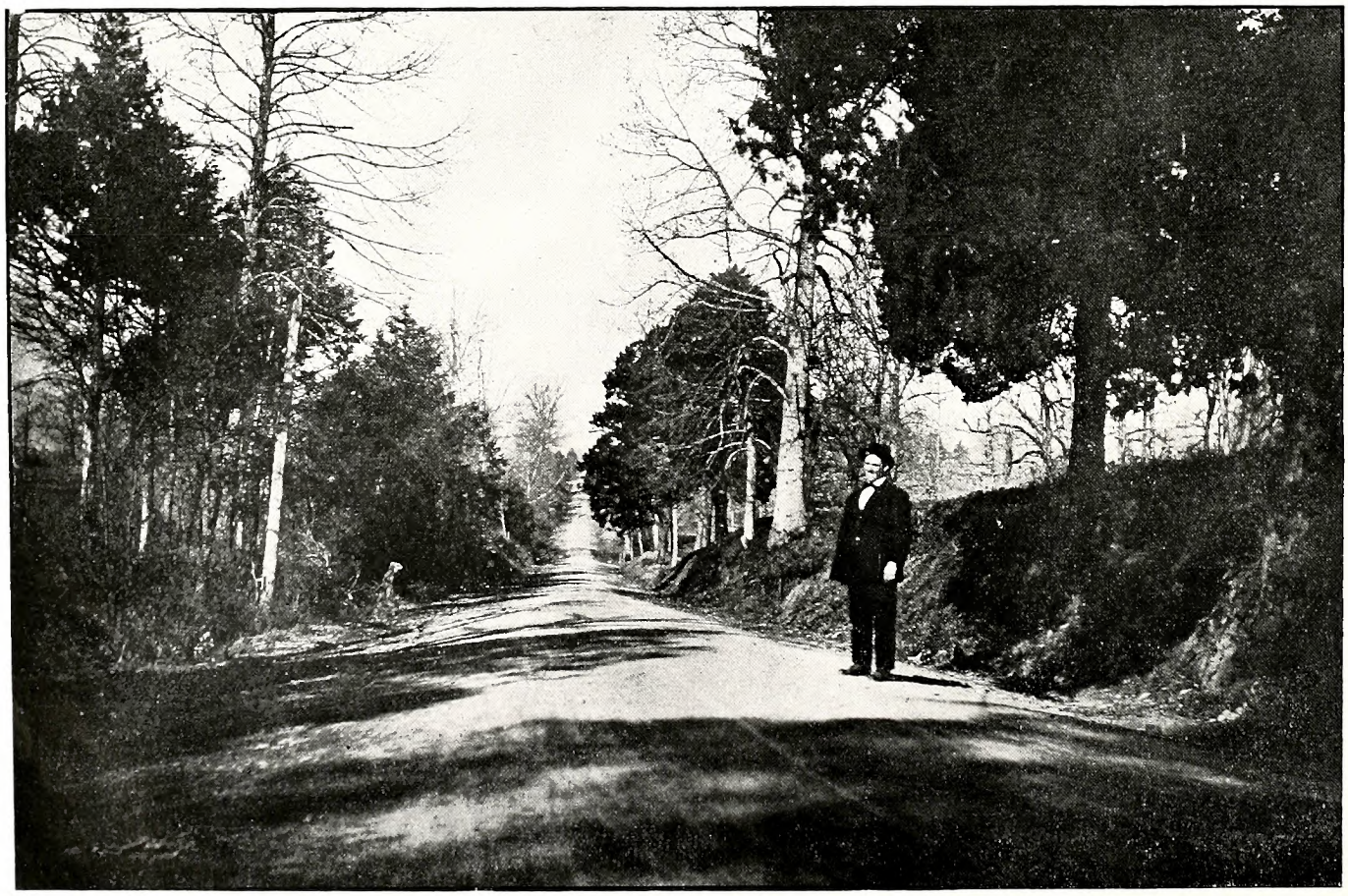
SINKING-FUND BONDS.

The majority of highway bonds now outstanding have been issued as straight terminable bonds to be retired by sinking funds. The term of these bonds varies from 10 to 40 years, with an average of nearly 25 years. The fund to retire these bonds is accumulated by annual installments paid by the taxpayers, and is supposed to draw interest continuously and to accumulate a sufficient amount to discharge the debt at maturity. The interest which the sinking-fund draws is usually from 1 to 2 per cent less than the interest paid for the loan. Five per cent highway bonds are common with the sinking-fund calculated to draw 3½ per cent interest. The following table shows the annual payments which, with interest at 3, 3½ and 4 per cent. compounded semiannually, will amount to $1,000 at the end of a term of years.

ANNUAL PAYMENTS.

Yrs.	3 per cent	3½ per cent	4 per cent
5	188.2699	186.3672	184.4796
10	87.1402	85.1208	83.1366
15	53.6780	51.7080	49.7928
20	37.1306	35.2499	33.4426
25	27.3469	25.5696	23.8829
30	20.9428	19.2739	17.7113

There are objections to the sinking-fund method of retiring highway bonds. It may not be possible to obtain continuously the requisite rate of interest on the sinking fund to discharge the debt at maturity. The existence of the sinking fund is a constant temptation to municipal officers to use it for purposes other than the purpose originally intended. If a county, for example, issues bonds for a second object, it is easy to argue that the sinking fund already accumulated may be used to purchase the new securities and the finances of the community are in a way to become much confused. This is particularly true since the officers in charge of such operations are frequently changing. Sinking fund tax levies may be deferred through carelessness or under pressure of other needs. The sinking fund always requires careful attention, because it does not progress automatically in most cases. It has sometimes been entirely neglected. The total cost of a bond issue retired by a sinking fund will be greater in the



Fine top soil road in Orange County, N. C., on the Central Highway, built under the supervision of Mr. R. T. Brown. Mr. Smyth Campbell, Assistant Engineer, appears in the picture. Photo by Mr. J. H. Slaughter.

end than the cost of the same bond issue made by either the annuity method or by the serial method.

ANNUITY BONDS.

By the annuity method of issuing bonds both the principal and interest are discharged by constant annual or semiannual payments. The amount of each payment or installment is determined by the term of the bond. It usually is necessary to subdivide the bond issue into individual bonds of $100, $500, or $1,000 each. The resulting periodic payment of principal and interest must vary slightly because of this adjustment. The following table shows in detail, the schedule of principal and interest repayments upon a loan of $100,000 for 20 years, retired by this plan at 4 per cent per annum. It will be seen that the amount of principal retired is small at first and constantly increases while the interest charge decreases. The sum of interest and principal remains constant, and this is an advantage as the tax is then uniform.

Main Street in High Point, N. C., in Front of Government Building

The following table shows the repayment of a 4 per cent $100,000 loan, including both principal and interest, by a uniform annual payment of $7,358.175 for 20 years.

Years	Principal owing at beginning of year	(Adjusted to nearest cent) Interest for year	Principal repaid at end of year
1	$100,000.00	$4,000.00	$3,358.18
2	96,641.82	3,865.67	3,492.50
3	93,149.32	3,725.97	3,632.21
4	89,517.11	3,580.68	3,777.49
5	85,739.62	3,429.59	3,928.59
6	81,811.03	3,272.44	4,085.73
7	77,725.30	3,109.01	4,249.17
8	73,476.13	2,939.05	4,419.12
9	69,057.01	2,762.28	4,595.90
10	64,461.11	2,578.44	4,779.73
11	59,681.38	2,387.26	4,970.92
12	54,710.46	2,188.42	5,169.75
13	49,540.71	1,981.63	5,376.55
14	44,164.16	1,766.57	5,591.60
15	38,572.56	1,542.90	5,815.28
16	32,757.28	1,310.29	6,047.88
17	26,709.40	1,068.38	6,289.80
18	20,419.60	816.78	6,541.39
19	13,878.21	555.13	6,803.05
20	7,075.16	283.01	7,075.16
Totals	.....	$47,163.50	$100,000.00

SERIAL BONDS.

The serial bond differs somewhat from the annuity bond, because, instead of keeping the annual payment of both principal and interest constant, the principal alone retired each year remains fixed. This type of bond has become more common for highway purposes in recent years, and during 1912 and 1913 the number of serial issues exceeded the number of issues for any other single given term. The office of public roads received reports for these two years of $15,300,819 in serial highway bonds, which is over 20 per cent of the total county and district bonds for which the period or term of issue was reported. In the next table are given the necessary annual payments of interest and principal for an issue of $100,000 for 20 years at 4 per cent where the bonds are retired by annual payments of $5,000 each. The first retirement is sometimes deferred for a number of years. Following is the schedule of interest and principal to retire a loan of $100,000 at 4 per cent (serial $5,000 annually.)

Years	Principal outstanding at beginning of year	Interest for year	Principal repaid at end of year	Total
1	$100,000	$4,000	$5,000	$9,000
2	95,000	3,800	5,000	8,800
3	90,000	3,600	5,000	8,600
4	85,000	3,400	5,000	8,400
5	80,000	3,200	5,000	8,200
6	75,000	3,000	5,000	8,000
7	70,000	2,800	5,000	7,800
8	65,000	2,600	5,000	7,600
9	60,000	2,400	5,000	7,400
10	55,000	2,200	5,000	7,200
11	50,000	2,000	5,000	7,000
12	45,000	1,800	5,000	6,800
13	40,000	1,600	5,000	6,600
14	35,000	1,400	5,000	6,400
15	30,000	1,200	5,000	6,200
16	25,000	1,000	5,000	6,000
17	20,000	800	5,000	5,800
18	15,000	600	5,000	5,600
19	10,000	400	5,000	5,400
20	5,000	200	5,000	5,200
Totals	.....	$42,000	$100,000	$142,000

COMPARISON OF SERIAL, ANNUITY, AND SINKING-FUND BONDS.

It will be noticed that the total expense to the community under the serial plan is somewhat less than under the annuity plan. The expense by either method is, however, considerably less than the expense under the sinking-fund plan. For the purpose of comparison the total expense to the community under each plan is assembled in the following table:

TOTAL COST OF A LOAN OF $100,000 FOR 20 YEARS, COMPOUNDED ANNUALLY.

Interest (per cent)	Sinking Fund 3 per cent	Sinking Fund 3½ per cent	Sinking Fund 4 per cent	Annuity	Serial
4	$154,440	$150,720	$147,160	$147,152	$142,000
4½	164,440	160,720	150,160	153,752	147,300
5	174,440	170,720	167,160	160,490	152,500
5½	184,440	180,720	177,160	167,359	157,750
6	194,440	190,720	187,160	174,369	163,000

It is an unfortunate fact that most highways do not have a life of 30 years, and it is now quite evident that the life of the highway and not the apparent economic term of the bond should determine the length of the loan. Many miles of natural soil roads are annually built by 30-year bond issues. There is usually no provision for repair and maintenance charges, and little business organization in the county road system. This practice is financially dangerous. No gravel road surface can last 30 years, and apparently the only road surfaces for which a 30-year life is recorded are surfaces of far more expensive construction than are usually built under the bond issues reported.

There is a further advantage in the annuity or serial bond for highway construction, because it is more likely under such a bond that the road surface will be paid for before it is entirely worn out. If an annuity or serial bond begins to mature immediately, this is not considered a serious objection among bankers. From the nature of the annuity or the serial form of highway bonds it is never necessary to issue new or refunding bonds at the end of the term. The main advantage, however, of both of these types of bonds is that the community saves more money than under the sinking fund plan because it avoids paying a higher rate on borrowed money than it can obtain on money that it loans.

Both the annuity and the serial bond have the advantage that they accomplish with one financial operation all that the sinking-fund type of bond can accomplish. These types of bonds are particularly adapted for financing operations which by their very nature involve a wasting of the property. A highway is in part a wasting property and it is desirable to have established a margin of safety in highway financing. Railroads frequently issue serial equipment bonds for a period of 10 years with which to purchase rolling stock. The amount of bonds required annually is carefully adjusted so that the retirement is faster than the depreciation of the rolling stock. The difference between the outstanding bonds and the value of the equipment in any year is the margin of safety.

Special Form of Annuity Bond.

In the operation of the annuity bond both principal and interest are discharged by a series of equal installments, usually semi-annual. Each installment contains interest on the amount outstanding at the beginning of the interval, and the balance is applied to retiring the outstanding principal on the bonds. The effect of this method is to diminish steadily the investment of the purchaser. If, however, the nominal rate of interest paid on the bonds is not greater than can be earned by a sinking fund such as, for example, with government bonds and a few state issues, the borrower might arrange to set aside in a sinking fund a portion of each installment paid, equal in amount to that devoted to the reduction of the principal in the first installment, and the effect would be to leave the total investment of the purchaser undisturbed until the sinking fund had accumulated to the amount of the loan. When the proportion of the installment applied to the sinking fund is thus taken arbitrarily, the term of the bond is absolutely determined and a modified sinking-fund plan results.

Galion Iron Works Employes Receive Fine Christmas Gifts.

The Galion Iron Works & Mfg. Co., of Galion, Ohio, the largest manufacturers in the world of Culvert Pipe, Road Makers' Machinery, Contractors' and Municipal Supplies, made a Christmas presentation of a Life Insurance policy to every one of its employes from the President down. These policies are issued through the Group Insurance Department of The Equitable Life Assurance Society of the U. S. and guarantee absolutely in the event of death from any cause whatsoever, to pay the salaries of such employes to their families each month for an entire year.

Mr. D. C. Boyd, president and general manager of the company, when interviewed in connection with this Group Insurance transaction, said, "We regard every one in our service as an important integral part of our company and of distinct value in carrying our purposes into effect. The officers of the company have the keenest interest in the welfare of each individual connected with us and have taken every possible precaution to surround them with the most modern equipment for their safety and comfort. We know of no other way in which we could more efficiently manifest our concern for our employes than through the protection

MR. D. C. BOYD
President and General Manager of the Galion Iron Works & Mfg. Co., Galion, Ohio.

of their families and it is our hope that these life insurance policies will add something to their feeling of security.

The officers and directors of the Galion Iron Works & Mfg. Co. consists of D. C. Boyd, president and general manager, G. L. Stiefel, vice president, F. W. Faber, treasurer B. T. Moyer, Secretary, H. Gottdiener, W. P. Kimble, Dr. C. D. Morgan.

Valuable Report on Federal Aid.

Persons interested in the good roads problem, either from the engineering or the legislative standpoint, will find the report of the Joint Congressional Committee on Federal Aid to Good Roads a convenient source of information. It not only contains the most extensive data ever published on this subject, but contains a bibliography which gives a list of books, pamphlets, and speeches on all phases of the good roads problem. The report is printed as House Document 1510, Sixty-third Congress, Third Session, and copies may be secured by application to members of congress.

Annual Road Expenditure $204,000,000.

According to the report of the Joint Congressional Committee on Federal Aid to Good Roads, the annual expenditures for road improvement in the U. S. will amount to about $204,000,000. Automobile license fees amount to about $8,000,000 annually. County, township and district road bonds were voted in 1913 to the amount of $50,635,000.

Lee county, North Carolina, has voted an additional bond issue of $100,000 to complete its road system.

The Dixie Highway

By HAL F. WILTSE

Assistant Secretary Chamber of Commerce, Chattanooga, Tenn.

W. S. Gilbreath, secretary of the Hoosier Motor Club, Indianapolis, made a tour in January through the states which will be traversed by the Dixie Highway. The idea of improving all roads between Chicago and Jacksonville, and connecting them up where gaps exist, was advanced by Mr. Gilbreath recently and the project has taken hold all along the line in fine fashion. He is working with might and main to the end that a start be made, and other organizations, notably the Chattanooga Automobile Club, Chamber of Commerce, and the Tourist & Convention Bureau, are in the harness and pulling for success.

The climax of Secretary Gilbreath's tour came when he reached Chattanooga, on his way back to Indianapolis, after visiting many places in Georgia and Florida. The Chattanooga Automobile Club tendered him a banquet which was attended by about 165 members and invited guests. The affair was a rousing success both as a courtesy to Mr. Gilbreath, to whom the whole south and especially that portion along the proposed Dixie Highway feels indebted for his suggestion and activity, and as a preliminary to the conference of governors, April 3rd. A pretty feature of the banquet was when the club presented Mr. Gilbreath a handsomely framed picture of beautiful Moccasin Bend in the Tennessee river, as seen from Lookout Mountain.

Opening his address, Mr. Gilbreath declared that he is not a road builder but a good roads enthusiast. "I owe my enthusiasm to Carl G. Fisher," he said, "who has done more for the good roads movement than any other one man in America." Mr. Gilbreath's talk brought in the Lincoln Highway a great deal, especially to emphasize that, once a definite official route is selected for the Dixie Highway, improvement here and there will soon be apparent, although it may be many years before the highway reaches the degree of perfection which is sought. The Hoosier Motor Club's tour to the Pacific coast was explained, with the aid of stereopticon views. Some scenes along the Signal Mountain boulevard, from Chattanooga to the all-year-round resort that bears that name, were also shown, as examples of good road, especially appropriate because it is being strongly urged that the Cumberland mountain route, which would include the Signal Mountain boulevard, be chosen for the Dixie Highway. Mr. Gilbreath urged that the official designation, whatever route it may cover, be made promptly so that the project could assume more tangible shape and communities along the route get busy with improvements.

Among the other speakers was President Richard Hardy, of the Dixie Portland Cement Co., Chattanooga, who was called on specifically to "tell what he knew about good roads." He made a strong and very logical argument for permanent roads, either of concrete construction throughout or with a concrete base, arguing against the practice, all too common throughout the country, of building inferior roads which wear out before the bonds mature. He cited, as an example of proper road building, Wayne county, Michigan, where a carefully prepared plan of highways is being worked out and concrete roads established as fast as time and funds permit. He said that in Wayne county the people as a whole are clamoring for more roads instead of grumbling about the expense, as every mile of permanent road constructed shows them the benefits in increased property values and betterment of transportation facilities between farms and markets. He stated that southern cement manufacturers would certainly support any improvement for permanent highways.

C. C. Gilbert, secretary of the Tennessee Manufacturers Association, a long time and enthusiastic booster for good roads, made an excellent talk emphasizing that Tennessee should unite in support of whatever route is chosen. He is a Nashville man and favors the route which includes the capital city. Mr. Gilbert referred to the old stage coach route between Nashville and Louisville which is still in fair condition and could be put in first class condition without very heavy expenditure.

Selection of the official route and transaction of other important matters bearing on the project will be taken up at a meeting April 3rd at Chattanooga. At instance of the Hoosier oMtor Club, Governor Ralston of Indiana, issued a call for this meeting to the governors of the other states interested Illinois, Kentucky, Tennessee, Georgia, and Florida. Hence, the meeting is dubbed a conference of governors, although hundreds of other good roads enthusiasts in the states affected, and throughout the nation, are being invited. All the governors have accepted except Gov. Trammell, of Florida, who may be kept away on account of the legislature being in session. If so, Florida will be represented by some other high official. Among the distinguished good roads men invited are Henry B. Joy, president of the Lincoln Highway Association; officers of the American Highway Association; John Howe Peyton, president of the Nashville, Chattanooga & St. Louis railway; Adolph S. Ochs, publisher of the New York Times; and many others. Judging from the correspondence which began pouring in to Chattanooga Automobile Club and the Hoosier Motor Club, as the April meeting was announced and invitations were issued, the meeting will be a large and enthusiastic one.

It is conservative to say that the southern states immediately affected by the proposed highway have taken hold of the project heartily and with keen appreciation of its value. The interest extends further south in Florida than Jacksonville which originally was designated as the southern terminal. The Miami people want it known as the Chicago to Miami highway. Dade county, in which Miami is located, plans a bond issue to improve their section of the route. Madison county, adjoining Dade on the north, has similar intention. From St. Augustine to Jacksonville a brick highway is being constructed. Mr. Gilbreath found great interest wherever he visited in Florida and declares the state will have a strong delegation at Chattanooga.

Great enthusiasm is encountered in Tennessee, especially at Chattanooga and in Coffee county. Coffee's link in the highway, if the Nashville route be chosen, is in bad shape now but there is determination on the part of citizens to improve it.

Nicholas county, Ky., will vote next month on a bond issue of $125,000 for roads.

GOOD ROADS NOTES
GATHERED HERE and THERE

Alabama.

Thirty-three counties of Alabama have entered actively upon the construction of good roads since the first state aid road was built under the supervision of the Highway Department, notes the Montgomery Advertiser, and of these, thirteen counties have issued bonds or interest bearing warrants to forward the work. These facts appear in the report to the State Highway Commission by W. S. Keller, state highway engineer. This statement was made by the engineer in a report submitted separately from his quarterly report, which also was made to the commission at the January session.

In his quarterly report, Mr. Keller called attention to the fact that state aid road work which will cost $82,633.34 was begun during the quarter ending December 31, 1914. Highway constructing of this nature was completed during the quarter in fourteen counties, he reported.

The state engineer points out in his special report that on the formation of the department, a comparatively small number of the counties of the state were engaged in road building, and these chiefly were large counties in point of tax valuations. The attention of the department has not been devoted entirely to the counties that were backward. Mr. Keller declares, as he and his associates have sought with equal earnestness to stimulate and sustain interest in the counties which they found already at work.

One of the greatest faults found, according to the state engineer, is the lack of system in some counties in the purchasing of supplies and road building machinery and materials, and in keeping accurate and comparative cost accounts.

He advocates a uniform system in all counties wherever it is possible, declaring that competitive bids should be received in these purchases. He deplores the inclination of some county commissioners to purchase from local merchants regardless of cost to the tax payers. "The local merchants should be favored, but not to the detriment of the tax payers of the county," Engineer Keller declares. He goes on to say:

"The indiscriminate purchase of road machinery and supplies cannot be too strongly condemned, and I believe a law should be passed requiring a county purchasing any machinery, tools or supplies to an amount exceeding $500, to advertise in a local paper and one of the large daily papers of the state for bids, the advertisements to run thirty days before the letting.

"We have encouraged the construction of steel and concrete bridges. We believe, however, that a county should not build expensive bridges to the detriment of road construction. It seems to be folly to build an expensive bridge that cannot be crossed for weeks at a time on account of the bad condition of the roads.

"A cheap road may be likened to a cheap horse—void of the owner's pride and condemned by the unfortunate who has to use him. There is a tendency on the part of some counties to build cheap roads. Such roads rarely outlive the term of the commissioners who build them and is a useless waste of county funds.

"The maintenance of roads after construction is the most difficult problem a county has to solve. Unless a road has the constant attention of someone it is sure to deteriorate rapidly, matters not how well it may be constructed. I am convinced that the fault lies mainly in the failure of county authorities to appreciate the difference between construction and maintenance and to entirely separate the two. Immediately after a road has been constructed, provision should be made for its maintenance. A special fund should be set aside in every county for this purpose.

"In concluding this report to you, I desire to say that we have had the hearty co-operation of nearly every county board in the state and I desire as your engineer to express my appreciation of the many courtesies shown us by every county official with whom we have had official dealings.

"I am submitting to you in addition to this statement, a map of the state showing thereon a proposed system of state trunk roads. As the counties will always have to bear the larger burden in the building and maintenance of trunk roads, I have provided a system whereby every county may be at least touched by such a road."

* * *

Arkansas.

The repealing of all of Act 302, passed by the legislature of 1913, beginning with section 39 up to and including section 77, and the submitting of an act "so worded that road improvement districts may be formed in a more business-like and simple way," is asked in the biennial report of the State Highway Commission of Arkansas. The section of the act which the commission asks be repealed relates to the creating of highway improvement districts and funds. The report says that this part of the act is so worded as to make the issuing of road bonds useless since the opinion of the attorney general is that the legality of such bonds created under the law might be made an issue in the courts, and consequently there would be no sale for them.

Other legislation recommended is the changing of the automobile tax law so that persons who purchase cars after August 1 will be required to pay but half the tax for the year and that cars be taxed according to their horsepower; the appropriation of a sum to be used in buying road models; the passage of a law which will place the entire road funds of each county in the hands of the county court to be spent under the supervision of county highway engineers appointed by the court and approved by the highway department; the purchase of all school sections having thereon road building materials; legislation providing a comprehensive plan for the working out of a state highway system; provision for the building of a highway from Little Rock to Fort Smith; a road improvement district law; the requiring of all bridge contracts to be awarded by the county court and the construction of them supervised by the highway department, and the appropriation of from $80,000 to $105,000 for the purchase by the state of a rock quarry and crusher.

The report shows that during the past year 93 miles of permanent roads have been built in Arkansas at an average cost of $5,300 per mile. The roads were built by bonds which will tax all land within three and one-half miles of the roads $2.31 per acre for 20 years. The report states that the roads of the state are in a deplor-

able condition for the most part, less than four per cent of the 36,000 miles of the roads in the state being improved. Plans have been worked out for the construction of macadam roads in a number of counties and the work is expected to go on rapidly in case the law regarding the creating of road improvement districts is changed, says the report.

The report contains a set of standards for different kinds of roads and for bridges and culverts, prepared by Hugh R. Carter, state highway engineer.

* * *

Kentucky.

It is interesting to note that in the 98-mile stretch between Cumberland Gap and Crab Orchard, Kntucky, over which Daniel Boone marked a trail, Bell county, Ky., soon will vote on a bond issue of $250,000 for the building of the Boone highway.

Knox county, Ky., will vote on a bond issue of $200,000.

Ten miles of the highway are now being built in Rock Castle county by subscription.

Laurel county will vote on a bond issue of $100,000.

Whitley county will build that part of the highway from Jellico to Corbin, Ky., having already agreed to it.

The bond issues will be voted on soon.

It was the purpose to begin with, as has been stated in Southern Good Roads, to build a highway connecting the famous Blue Grass section with the highways of East Tennessee, and the highways of Virginia may also be reached.

By a new law in Kentucky, five per cent. of all realty and personal taxes received goes into a general road fund. The total obtained for roads in this way is about $600,000 annually. This, added to the automobile tax of approximately $100,000, which also goes into the road fund, makes a grand total of $700,000 for roads in Kentucky.

Counties that wish to build roads and highways may issue bonds for any amount, and it will be paid back out of the state fund at the rate of not over two per cent. of the issue each year. Thus, a county that votes a bond issue of $100,000, will get two per cent. of the amount back each year until the issue is retired.

Taking advantage of this liberal offer, the counties which are to vote bond issues for the Boone Highway will lose nothing, while those that do not will have everything to lose. This is the statement of the citizens of the counties themselves.

* * *

Oklahoma.

Lieutenant Governor J. J. McAlester, of Oklahoma, having completed his four years term of office, retired January 11. He made a noteworthy farewell address to the Oklahoma state senate, of which he had been presiding officer for four years. Among other things Mr. McAlester said:

"You have accomplished much, but there is still a great work before you. And if you will permit, there are two things in particular that I consider of first importance, the consummation of which will be of greatest and lasting profit and benefit to our people. Not only for the present but to our children who come after us.

"Give us prosperous farmers and we will have a rich and prosperous state. Enrich the soil where once it was poor; bring all the farmers to market by means of good roads, and the result will be prosperity to our farmers.

"Then, let us enrich our farms, by manufacturing in our state penitentiary fertilizer to be sold to our farmers at cost of production. I have carefully studied and considered this proposition, and it is practical and feasible. To go into detail today would be too long and too tedious, but I would be glad to give it to you at some other time.

"The building and maintaining of a system of roads means more than anything else. This is feasible, practical and can be accomplished without any considerable expense or burden upon the people. We have in our penal institutions at all times an average of 1,500 able-bodied men, a thousand of whom can be kept at work in producing material and road building without additional expense for their keep.

"With but small expense the state can acquire at different points in the state quarry lands, place thereon convicts to quarry and crush the stone for road material; also, for a small expense, acquire a cement bed and plant to be operated by convicts, and produce material for culverts and bridges to be of concrete. Prepared material produced by the state in this way will be probably less than one-third the price now paid.

"At the same time enact laws authorizing the various counties to issue their long term bonds for the construction of roads and bridges. The state to encourage the counties, will furnish the prepared material, the engineering and the general supervision and building.

"It might be urged that the building of state highways in this way some counties or county would fail to issue their bonds. If that contingency should arise, stop at the county line and pass on to the next, and later when the recreant county sees what has been accomplished she will quickly fall in line.

"It might again be urged that trouble might arise in selecting the location for the road. Solve this by placing the authority in the hands of the state and assess a charge commensurate with the benefits received against the lands along the highway.

"The administration that makes possible the accomplishment of this will be immortalized. 'Their children will rise up and call them blessed.' It will be a monument more lasting and enduring than marble or bronze.

"Wishing that the future may be generous as well as just with you, each and all, I bid you godspeed and farewell."

* * *

Ohio.

Five hundred and fifty miles of improved roads were contracted for construction by the state highway department of Ohio, at a total cost of $7,000,000, during the last year, according to the annual report of State Highway Commissioner Marker, filed recently with Governor Cox.

During the same period 140 miles of improved roads were completed and 307 repaired. The state also assumed future responsibility for the maintenance of 600 miles more, which were turned over to it by the counties.

If this rate of progress in road-building is maintained, Mr. Marker says, the 9800 miles of highways which comprise the official intercounty and main market roads system will be improved in 10 years.

* * *

South Carolina.

The committee on highways of the Charleston Chamber of Commerce has approved the report made by Reid Whitford, a well known civil engineer, on the proposed system of state highways. Mr. Whitford is the engineer of the Charleston drainage and sanitary commission. It is understood that the Charleston

Chamber of Commeree will champion the passage of a law by the general assembly based on Mr. Whitford's plans.

Mr. Whitford proposes, says the Columbia State, that the state highways be built under the supervision of a state board, consisting of the commissioner of agrieulture, commerce and industries, three engineers and one farmer, employing a chief clerk and draftsman. The report goes into details as to the best method of building the state highways. It is proposed that each county should construct those branches within its boundaries with convict labor under the supervision of a county road engineer.

One of the most important sections in Mr. Whitford's report is that the state should tax motor drawn vehicles, using the money raised to aid the counties in bearing the expenses of road work to be directed from Columbia by the state board.

"Every one is aware that hundreds and hundreds of thousands of dollars of the people's money have been expended in socalled road work in the state—here a little and there a little—with no fixed plan to follow, no special end in view, until today, after efforts of the kind harking back for 200 years, there is not a highway in South Carolina extending continuously through the state which could be properly designated as a road of the first class, or over which travel could be made in wet or dry seasons alike," says a seetion of Mr. Whitford's report.

Accompanying the report is a blue print of the proposed system of highways reaching every county seat in the state.

* * *

Texas.

A bill creating a state highway department under the administration of a state highway commission, composed of three members, will be presented early in this session of the legislature by the Texas State Good Roads' association.

This was decided upon at a meeting of the executive committee of the association at Austin, Tex., Jan. 11, during which the bill was outlined.

The bill as outlined provides for an engineering department under the supervision of the commission. This engineering department to be subject to the call of all counties considering the construction of good roads, giving them expert advice as to all features involved in that class of work.

Under the proposed department it will be the duty of the commission to investigate conditions in every county, to recommend highway systems based upon all actual traffic needs and to recomend types of construction most suited to the needs of each locality, having regard to the proximity of materials and costs.

According to Mr. Walter H. Beck, of the Fort Worth Chamber of Commerce, who attended the meeting, there are other provisions in the proposed bill tending toward more judicious expenditure of road funds by the various counties.

It is outlined that funds with which to support this department may be obtained by a special tax on automobolies.

"The small registration tax of 50 cents per year now goes into county funds," said Beck, 'but amounts to practically nothing for each county under the present system. Under the proposed bill the counties will retain about one-third of the special tax, this one-third to be used as a maintenance fund.

"The bill as outlined will call for a flat tax of $3 on each automobile in the state. It is evident that two-thirds of the amount that will be raised by such a tax will be ample to support the work of the highway department.

"This is only the first step in the revision of the highway laws of Texas," continued Mr. Beck. "Our present highway laws were adopted many years ago, and changed conditions have rendered them almost entirely obsolete.

"One of the early bills in contemplation provides for a special wheel tax. This will place a special tax on every wheeled vehicle that uses the public roads. The tax rate with probably be graduated according to tire widths. Wagons equipped with 3 and 4-inch tires will, of course, bear a lower tax.

"Revenues to be derived from the wheel tax will all be retained by the respective counties in which the taxed vehicles are located, and be used only for maintenance purposes.

"The provisions adopted in the proposed bill creating the state highway commission department are now in force in thirty-three other states.

"One duty of the proposed highway department will be a careful study of advanced highway legislation and the enactment by the legislature of such laws as may be needed from time to time to bring the highway laws of Texas in line with changed conditions.

"As evidence of the need of improved highway laws in Texas, it should be understood that a majority of the counties that are doing any extensive highway work have secured the passage of special county road laws suited to their needs. It is hoped by revising special county road laws to render unnecessary these special county road laws and to bring the whole state under a uniform system of highway legislation."

* * *

Tennessee.

"The state of Tennessee should take the advanced step of placing convicts on roads," states John L. Calloway clerk of the Knox county county road commission. "I am confident that this will be done, as the party in power is pledged by its platform to place the short term men on the roads.

"From experience of four months in working convicts on roads, and these months being winter months, I am convinced that it can be made profitable to the state and do away with the competition with free labor. There is a difference in the convicts the state receives and those the county receives. Many of the cases going from justices of the peace to the workhouse are persons that are unfit for work during the first week, and sometimes longer to work on the roads. Many have fines of about $7.40 to work out, and this is only a short term in the workhouse. With a poor class of convicts, with a short term or small fine, it costs the workhouse department something to get the prisoner in shape for working roads. But where a convict has several months to serve he makes a better convict, as he gets accustomeded to the work. There is no good reason why the convicts cannot be treated as humanely while working on the road as working in the mines digging coal, or under the contract system in the foundry, or other trades. The only advantage they could have in the walls is that perhaps they would learn a trade. But for the betterment of the state, I am convinced that this legislature should pass a law, and I believe it will, that will remove at least part of the convicts from competition with free labor.

"This could be tried, and if it proved a success then all of the convicts at some future legislature could be removed."

The Automobile in the South

The Louisville Automobile Show.

The Lonisville, Ky., Automobile Show, scheduled for the first week in this month, promised to be a great event. An extended account of the show will be given next month. It was planned to make it the biggest and best exposition of the automobile industry in the United States, outside of the New York and Chicago shows.

Two big days were planned, Kentucky Day on Tuesday, February 2, and Indiana Day on Thursday, February 4. Governor McCreary, of Kentucky, Governor Ralston, of Indiana, and their staffs, were invited to be present on these days.

* * *

Automobiles Contribute Nearly $8,000,000 to Road Building.

A table prepared by the U. S. Office of Public Roads shows that automobile owners paid in licenses and fees in 1913, $7,820,895, nearly all of which was applied to road work. This sum is about one-thirtieth of the total state and local expenditure for roads.

* * *

Automobiles at Houston.

Reports come from the county clerk at Houston, Tex., that since the first of January all records for the registration of motor vehicles have been smashed. From the first to the seventeenth, licenses had been issued for 158 cars.

* * *

"Jitney" Lines.

From the Lone Star State comes a brand-new term, "Jitney Line," meaning an automobile transfer line. Some enterprising citizen of Houston started it. One account credits Smith & McCormick, of Houston, with it. This firm bought four Fords and started them to work on Montgomery avenue in that city, chasing the elusive "Jitney," a slang name for the humble nickel. This paid so well that within 90 days there were some 200 cars out after the humble five-cent piece.

Enthusiastic "Jitneyites" claim that the Jitney cars will eventually put the street cars of Houston and of every other big town out of business, because they furnish transportation at the same price and a great deal quicker than the street cars do.

* * *

Autos Are Cheaper This Year.

According to an interesting table of statistics published in the Auto, a periodical devoted to the motor car industry, there is to be a reduction this year in automobile prices, the reduction extending all along the way.

The Auto shows that this year 187 varied types of cars will be made to sell at $3000 or more, 126 types to sell from $2000 to $2999, 122 types to sell from $1250 to $1999 and 100 types to sell under $1250.

This shows a total of 535 types, but this does not indicate that there will be that number of separate and distinct makes of autos turned out in the United States. Some companies build cars that will come under two or three of the general price headings.

Average prices for the four classes this year will be $855, $1419, $2545, $4563.

Last year the average prices were $950,$1650, $2460, $4700.

* * *

Predicts $500,000,000 Auto Business.

Mr. John N. Willys, president of the Willys-Overland Co., predicts that there will be half a billion dollars worth of automobiles sold in the United States in 1915. He believes that a wonderful era of prosperity faces this country right now.

"The new year brings with it a national trade revival that will be felt in all branches of our industrial life," states Mr. Willys. "Business already is beginning to boom. The optimistic spirit of the banker, farmer, merchant and manufacturer alike plainly indicates a wave of prosperity.

"A thorough investigation of conditions shows that business confidence has returned after the setback caused by the opening of war. We all do business on good cheer, courage and hope. Although the sudden crisis caused by European hostilities almost deprived us of these for a while, and brought about a psychological depression, we have recovered from the shock. Trade has been steadily picking up since last October.

"Enormous orders from abroad are keeping our textile industries busier than they were last year at this time. The hardships threatened in the cotton belt of the south have been averted. The opening of the federal reserve banks has relieved the stringency of the money market. And most important of all the American farmer is more prosperous today than ever before.

"It is difficult for city dwellers to realize this fact, but the farmer is America's greatest purchasing power. Consequently his financial status is the best criterion on which to base an estimate of the country's prosperity."

* * *

A big prosperity bulletin that adorns the front doors of the Buick agencies, calls attention to the fact that nineteen solid train loads of Buicks were sold and shipped from the factory in eleven days—from December 21 to December 31. There were 2,696 cars in the lot representing a value of $2,965,738. The cars were shipped from the factory at Flint, Mich., and distributed to dealers all over the country.

* * *

It is the boast of the Ford car people that any part part of a Ford automobile made within the past six years will fit any Ford car made today. That is because of the standardization of the car and is of advantage because the owner of a Ford can drive up to any Ford agency and ask for a broken part or any repair and all he has to do is to give his number. The re-

pair part in stock will fit. An illustration of this was shown recently when a tourist limped into Muskogee, Okla., with a car that looked like a cyclone had struck it. He drove up to the Ford agency, pulled off the broken parts, replaced them with new ones and drove on much as if practically rebuilding a car was an every day incident.

* * *

The Cole Motor Company of Indianapolis, announces an 8-cylinder Cole car. The motor will be of the conventional V-type, and will have a 3½-inch bore and a 4½-inch stroke. It is said to develop thirty-nine horsepower, American Automobile Association rating.

It is thought the eight-cylinder car will use the same chassis as the six-cylinder Cole.

* * *

The Twelve Cylinder Next.

Twelve-cylinder cars are the next surprise the motor car engineers are preparing for the public, according to positive statements made by Detroit automobile dealers. It is said that the Winton Company of Cleveland is working on such a car and that a Detroit company, name not given, also will have one ready for 1916.

* * *

For a Federal Registration Act.

Congress now will be asked by a million and a half of motor car users to pass the Adamson measure. The American Automobile Association, has taken the matter in hand, and President John A. Wilson will confer in Washington with Representative William C. Adamson, of Georgia, chairman of the committee on interstate and foreign commerce, and the author of a commonsense measure concisely set forth in the following extract:

"No person who shall have qualified by complying with the laws and regulations of the state, territory, or district of his residence to use and operate such vehicle or vehicles shall be required in any other state or territory or district in to which he may go for business or pleasure to make any additional registration or take out any additional license in order to use and operate any such machine."

For some time the Adamson measure has rested in committee awaiting a decision by the U. S. supreme court on what has been known as the "Maryland Case," wherein a resident of the District of Columbia contended that he had the same right as any other vehicle owner to the use of Maryland roads as long as he had provided himself with an identification number from his home district, and thus made it possible to apprehend him in case he violated any of the highway laws of the commonwealth.

But in the decision rendered by the highest court in the land, written by Justice McReynolds and concurred in by all the justices, it is held that in the absence of a national law a state has a perfect right to enact whatever laws it may see fit in relation to the automobile. Furthermore Justice McReynolds holds that "the movement of motor vehicles over the highways is attended by constant and serious danger to the public, and is also abnormally destructive to the highway itself." Further on the justice states: "In the absence of national legislation covering the subject, a state may rightfully prescribe uniform regulations necessary for public safety and order in respect to the operation upon its highways of all motor vehicles—those moving in interstate commerce as well as others."

President Wilson of the A. A. A., commenting upon the situation says:

"The inference of the highest court that there should be a national law covering the subject should prompt our immediate attention to the matter, for it is certainly a most unusual situation when a citizen of the United States is not free to travel in any section of the country after he has provided himself with an identification number from his home state. The European countries, with different languages and different customs, have agreed upon an international plate of identity, and also an international triptyque relating to customs duties. For instance, a motorist of France after having obtained a home number—which incidentally allows him to operate a car in any part of France—then obtains in his own country an international plate which is acceptable in practically every other country in Europe, and he can cross and re-cross international boundary lines without any trouble whatever. Surely if European countries can agree in a matter of this sort, it does not seem reasonable that the several states of the union and the Capital district of the country should be unable to provide for free and uninterupted roads travel. It is now generally reeognized that a state must provide sturdier road construction because of the multiplying of a faster and more economical road vehicle. With a logical plan of federal participation with the several states a large percentage of highways expense of an interstate character properly would be transferred to the national government."

* * *

Auto Truck Competes With Steam and Electric Roads.

Successful competition of the commercial auto-truck with the steam and electric railroad in the hauling of short-distance freight and passenger business, is given as one reason for extensive road improvement, in the report of the Joint Congressional Committee on Federal Aid to Good Roads. Discussing this phase of the subject, Hon. Jonathan Bourne, Jr., Chairman of the committee, says:

"A great system of rural transportation would be developed, with rates regulated by actual competition, open to rich and poor alike, as no expensive privately owned terminals, roadbeds, tracks, or equipment would be required. The good wagon roads would be open everywhere to the use of everybody, and the equipment, relatively inexepensive, would be within the means of many.

"This suggestion as to the use of rural roads by commercial auto-trucks and buses, is not merely a product of imagination. In several instances gasoline propelled buses are now competing successfully with city or interurban electric lines, and, where the haul is but a few miles, transportation of freight by auto-truck is found cheaper and more satisfactory than transportation by rail.

"In the case of the short haul, the saving in handling and in time more than counterbalances the lower rail rate. Instead of loading the commodities on a truck, unloading at the local railroad station, where they must be loaded upon the cars, hauled to the near-by city and then unloaded and again loaded upon a truck and hauled to the consignee, the user of an auto-truck who has a hard surface road available loads his products once, hauls to the door of his consignee and unloads, saving not only the handling but the time, the inconvenience of issuance of way bills and receipts, and avoids damage to goods or deterioration while in transit.

"We believe that permanent highways will result in very considerable adoption of auto-truck hauling in preference to rail transportation, where the distance is within a half day's run."

Stewart county, Tenn., votes this month on a bond issue of $100,000 for roads.

Knox county, Ky., votes next month on a bond issue of $200,000 for roads.

Corpus Christi, Tex., votes this month $100,000 of bonds for additional street paving.

Macon, Ga., votes on March 9 on a bond issue of $120,000 for street improvement.

The Maryland State Roads Commission has awarded a contract for paving in Baltimore amounting to $72,000, and contracts for other road work for $104,000.

The police jury of St. Tammany Parish, Louisiana, has contracted for 30 miles of roads at a cost of $35,000.

Road District No. 3 of Navarro county, Tex., has contracted for 19 miles of road at a cost of $75,000.

Sulphur Springs, Texas, has contracted for 35,000 square yards of street paving and other street improvements.

SEALED PROPOSALS FOR ROAD BUILDING.

Road Construction, New Hanover County, N. C.

Sealed proposals will be received by L. W. Moore, Commissioner, New Hanover County, Wilmington, N. C., until noon, Feb. 20 and then publicly opened, for constructing approx. 7½ miles of clay gravel road ten feet wide and spread eight inches thick (Clay gravel to be from the pits of the Cape Fear Gravel Co., Lillington, N. C., or its equal. Grading completed except depression for material.

Bids must be accompanied by certified check for $500,000. The successful bidder will be required to give bond amounting to 25% of contract price.

The right is reserved to reject any or all bids.

For specifications and proposal sheets write.

J. L. BECTON, Civil Engineer, Wilmington, N. C. L. W. MOORE, Com. Wilmington, N. C.

The state highway department of Louisiana has been asking for bids on 27 miles of gravel roads.

Tampa, Fla., will lay 78,000 square yards of paving on 25 different streets.

Morgan county, Tenn., has contracted for 80 miles of macadam road at a cost of $270,000.

Clearwater, Fla., will spend $40,000 in paving streets.

Charleston, W. Va., will pave 15 streets at a cost of $135,000.

Jackson county, Mo., will macadamize four miles of roads at a cost of $29,000.

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Surfaces For Light Volume Mixed Traffic

By S. PERCY HOOKER

State Superintendent of Highways of New Hampshire

IN A SUBJECT of this kind the first question to determine is the exact meaning of the title.

What is light volume mixed traffic? How many vehicles are to pass over a given piece of highway and still be classed as light volume? What is their relative proportion as to motor propelled and horse drawn? I confess I am not clear upon the right interpretation of these terms. There are sections of the country where presumably the mixed traffic would consist almost entirely of horse drawn vehicles, while in others a very large per cent would be motor traffic.

The treatment of the surface of these two sub-divisions would vary to a considerable extent. I am inclined to consider the subject as being the treatment of subsidiary roads roads which have only the horse drawn traffic originating upon the road, together with motor traffic of the pleasure class and little or no freight traffic which is motor driven.

From my point of view, the word "surfaces" is somewhat superfluous and the subject is the entire treatment, comprising the sub-grade and drainage conditions, which must be considered as part of the surfacing in order to treat intelligently its surface.

I shall treat the subject, therefore, broadly as the improvement of the ordinary country road as it now exists. The purpose being to obtain the greatest amount of linear feet with the least expenditure of money.

With the immense mileage of roads in the United States, it seems to me perfectly clear that even in the wealthier states a large proportion of the roads will never be improved under the types of construction which are now considered necessary for their improvement and that 90 per cent of the entire mileage will be unimproved if it is necessary to improve them with the higher types of construction.

My impression is that there must be a revulsion of feeling which will compel more mileage and lesser cost. Given then a country highway as it now exists and the proposition that for 10 miles of this road there is only available the sum of $25,000, what can we do to render this really an improved road, which under proper maintenance will take care of the traffic upon it? A preliminary survey may show that a portion of the road is in a low lying level section without proper ditches where at present the natural tendency of the road is to act as a sort of drainage canal for lands adjacent to it. The soil itself consisting partially of leaf mold containing a large amount of humus and which if used as a cultivated field would produce good crops.

The next portion may consist of a sand and gravel formation, containing boulders and on a grade of from 5 to 8 per cent. rolling over elevations and down into hollows and gullies and eventually working out into clear deep sand.

Succeeding this may be a hollow from which you rise upon a side hill cut through a clay bank. Here you face the proposition that the clay is of such a nature as to practically absorb all the water and where your drainage condition is most difficult to handle.

Your last section may be through ledges of native rock or large boulders, the soil slightly covered with either hard pan or sand and upon grades which easily wash under the annual rain falls.

On almost all country roads several of these conditions will ordinarily appear, while of course it is an exaggertion that they will all occur within the 10-mile stretch.

Confronted with these conditions it seems to me to be absurd to attempt a standardization of such a highway in order to economically work out your problem. You must use the material which is comparatively local and the treatment of each section will be different.

The width of the present highway must first be taken up and in general standardized for the ordinary traffic, probably a width of 21 feet between ditches is the most satisfactory standard and considering that this should be accepted as the width of the road, you are next confronted with the alignment and drainage.

In all probability the alignment will be comparatively easy over your level fertile setcion, but the drainage on this section will be your principal problem. Here in general you must first provide by deep ditching for reducing the water level of the surrounding land and by deep ditching I do not mean the ordinary ditch from which the crown of your road rises, but in many instances a ditch which acts to a considerable extent as a drainage canal.

You must provide culverts at all points where the drainage may be taken away from the road at every accessible point, and however level you may consider the plain or plateau as a whole, you will doubtless find a large number of places by which the water will be conveyed entirely away from the road and bother you no more.

In most instances the grading material obtained from the ditches, though seemingly of very inferior quality,

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A paper read at the Fourth American Road Congress, Atlanta, Ga., Nov. 9-14, 1914.

may be used to raise the general grade of your road and if kept dry by the side ditches will compact and make a fair subgrade.

Your next essential is in some way to obtain upon such raised grade a sufficient quantity of metal of some kind to prevent the cutting through of your road surface from water which falls upon the road or in flood seasons cannot be entirely carried away by your ditches. On my plan this may be obtained from either fields, stone fences or even drawn from section two, which has an entirely different soil. In some places it would be necessary to practically lay this stone as telford. In other places it it enough to simply dump it in the road and only partially place it by hand labor. In many places where a roller is available this may be the method and the stone simply forced into the soft material which you have excavated from the ditches and which has not as yet thoroughly dried out from the service rendered by the ditches.

Now what shall be applied as your surface material? In many places you will find that along or adjacent to the road there are hills or hummocks which contain soil not properly either hard pan or clay, but in many places a combination of each containing considerable metal in the shape of either pebbles or fractured stone, and having obtained your bottom through drainage and the addition of stone so that you are confident your sub-base will be practically dry, you may apply 10 inches of the material containing a small amount of metal and by the use of road drags and road hones bring this first into section and next into a smooth hard surfacing, which will prove satisfactory in all weather for traffic, provided it has constant attendance and is repeated after every rain dragged with the ordinary road drag. The drag removes every slight rut which may be started and does not allow the water to settle through your weak upper surfacing. The maintenance must be not intermittent, but constant. You may find that you still have a somewhat slippery upper surface in which case it will be necessary to add an inch or two of your gravel or sand from section two. You will find that this will only require from 3 to 6 yards of your gravel surfacing per 100 feet and while it may be at a considerable distance from the improvement, it will not add materially to the cost.

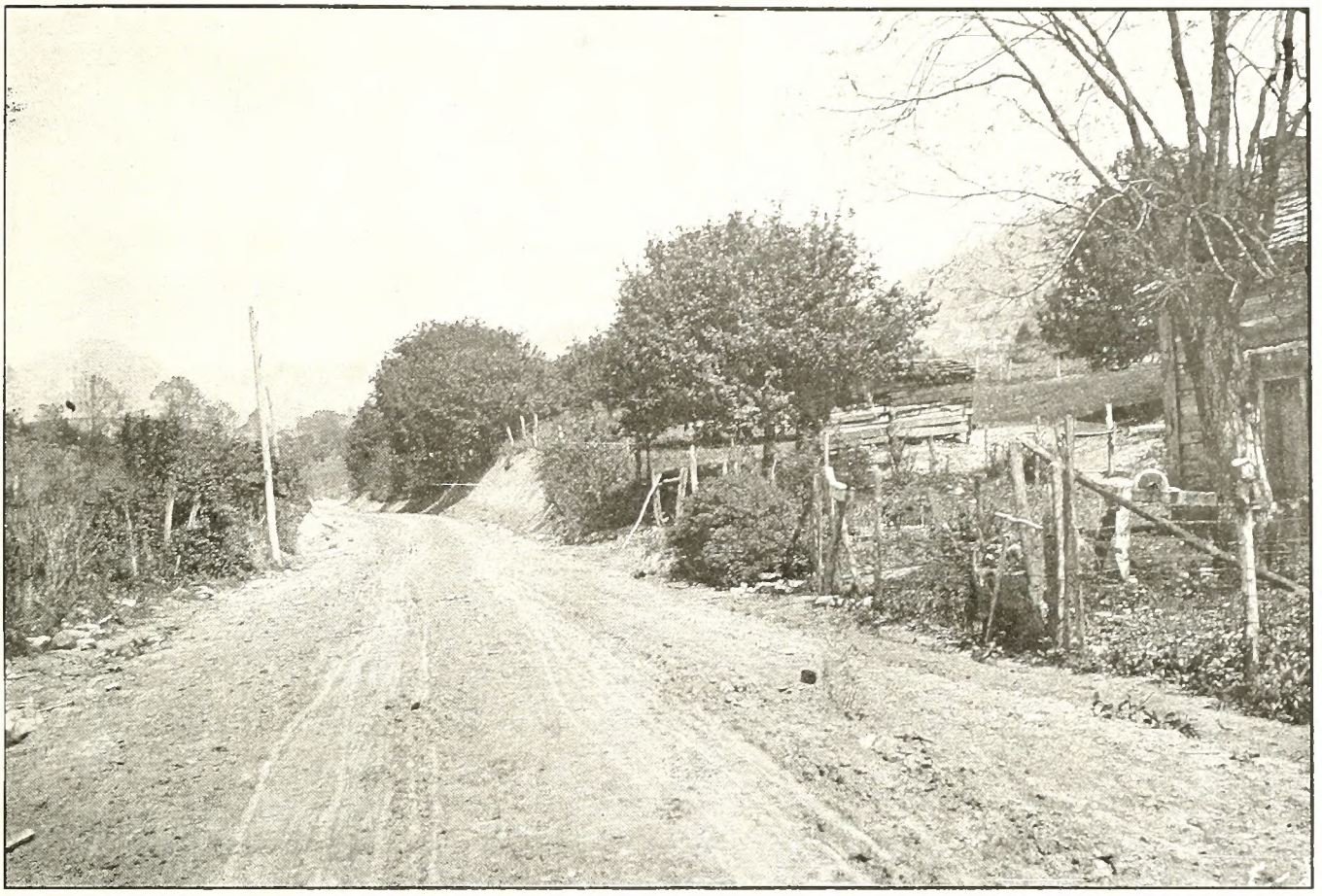
Your surfacing upon such a type of road will require practically 2000 yards per mile and if the material is from different banks along the roads your cost will not exceed twenty cents per yard. It is then perfectly feasible over this section to build such a highway, including the raising of the grade from 1 to 2 feet at a cost of not more than your estimated limit of $2500 per mile.

On section two, as I have imagined it, you have a problem of grading, rather than of drainage. That is, the soil will readily dispose of your water, but you must reduce the grades to a reasonable gradient and with a material provide some method for compacting the road. The first to consider then is what shall be your maximum grade.

I confess that in this class of construction I proceed backwards, like a crab, rather than attempting to dictate an absolute gradient. That is, I take the heaviest grade and see to which per cent I can reduce this with a reasonable amount of money, instead of saying arbitrarily that a 4 per cent grade is the maximum, I figure how much it will cost for a 4 per cent, how much less for a 5 per cent and what the saving would be, should I allow it at even a 6 per cent grade.

We will say that I have found that I may reasonably

Section of Bad Road on Big Stone Gap Highway in Virginia, Before Improvement Under Direction U. S. Office of Public Roads



Same Section of the Big Stone Gap Road After Improvement

reduce the grade on this section to 5 per cent. This I establish as a maximum and the other grades are brought to this maximum.

There will doubtless be considerable blasting on the large boulders to do on this section in order to properly widen your road, because the ordinary country road has no established width. In cutting your grades you will usually find that a considerable portion of the material which you have excavated in reducing the grade makes good surface material and almost your entire expense will be the shaping of your roadway and your drainage.

As I have imagined it, however, as you approach the end of this section you have run through your gravel and into what is practically sand. Here the gravel that you have on the other end will not properly compact or pack so as to make a suitable road surface and you will have to build practically a sand-clay road. I have not had good success with the sand-clay roads, unless I have practically telfordized the same by making the sub-base largely of metal.

In my treatment of this particular part of section two, I should endeavor from the gravel pits used on the first part of it to obtain the small boulders sufficient to build the entire bottom of the road to at least 6 inches in thickness of such pebbles.

These I should fill with sand up to the top of the metal, then put on at least three alternating sections of clay and sand repeating until I had my road at least 10 inches thick, harrow each section as it is built up, seeing that the top surface is of sand rather than of clay.

This portion of the section, as I advise building, will doubtless cost much more than the sum per mile than you have expended upon the gravel portion, but together they should leave your general average within the limit.

Section three, consisting largely of grade, is almost entirely a drainage proposition and it will be very necessary to practically tap the water coming from the side hill near the surface or originating within the road. You may find it necessary in many instances to run short drains for the express purpose of tapping the water holes, which come up in the road bed proper and it will doubtless be necessary on the inside of such a road to lay a side drain the entire length of every grade. A ditch should be dug on the upper side of your road to a depth of at least below frost line, a foot of sand being placed in the bottom and then an open drainage tile laid to as perfect a grade as possible and your ditch filled in with sand seems to be the most satisfactory way of cutting off this water.

Having shaped your clay road which is a comparatively easy matter as such a road will retain its section and may be practically worked with a road machine and then covered with, not to exceed 2 inches, of sand and gravel harrowed in as thoroughly as possible, though it is somewhat difficult upon a clay road to get the sand to work into it at first and the farther application during wet weather of at least 2 inches more, will ordinarily give such a road a most desirable surface. The only caution being that you must not apply the sand in large quantities at a time, but must expect to renew this surface frequently during the first two years.

We have assumed that we have now come to the ledge and boulder section and that all material must be drawn from a considerable distance to make a sat-

isfactory road. Here without question, the most feasible plan is to use a macadam roadway. The putting up of a local crusher and the macadam method of construction may enable you to build at a less cost than would the use of the unerushed material.

Frequently, however, on such sections there is a great difficulty in getting sufficient water to properly flush a water bound macadam road. You may obviate the use of large quantities of water by the use of bitumen but this adds greatly to the cost of your road.

Wherever macadam is used you may retain the same 21-foot section, though 15 feet should be the extreme width of the metalling. This will take 2600 tons per mile of stone and assuming the use of 2¼ gallons of bitumen per square yard, your added cost will be something over $2000 per mile. If water is fairly available, you may build your water bound road and apply one-half gallon per square yard of bitumen as a cover coat at a cost of about $650 per mile, which will reduce the cost of your road for light traffic about $1500 per mile. Unless there is considerable trouble about getting your water therefore I should recommend the use of water bound macadam with the blanket coat.

You must consider also the added cost of maintenance upon your macadam road as compared with the cheaper forms, so that personally I should hesitate about using macadam whenever there is a possibility of using the cheaper surfacing.

Assuming a small apportionment available for the entire mileage needing improvement the economic question is what plan will you adopt for the treatment of such a highway. Will you practically complete this 10 miles with your money or will you build 3 miles of the higher type of roadway and leave the rest unimproved. This seems to be the attitude adopted by most highway departments. They standardize their plans and specifications and are content with the small mileage of what they are willing to say is the best construction and they dislike extremely to build for small cost what they term an inferior type of road.

I believe this is a serious economic error and in most sections a road infinitely better than has previously existed may be built at a comparatively small cost to the great betterment of the roads in general and to the great help of the inhabitants of a state.

As far as automobile traffic is concerned, I am sure that many of the inferior types of road are far more satisfactory to them in general than the highest type. Your autoist cares little for a short section of the best possible road if at the end of it he plunges into what he is pleased to call an impassable road for three-quarters of the distance. I believe the development of roads in the future will be along the line of more mileage and less cost and that this is the proper trend of development.

I have talked so far almost entirely about the preliminary building of such surfaces. I want to say a little about the cost and methods of maintenance on these types of road.

Constant continuous maintenance is necessary upon all the types of roads that are built. It is indispensable, however, that upon the surfaces of the cheaper type of roadway the maintenance be both continuous and intelligent.

A road of what may be called natural surfacing, if left for even a week during the summer season without attention loses all its features of a good road. It must be constantly patrolled, all holes in it which have worn must be filled, all weak spots which develop must be repaired within a few hours after discovery or your road will so rapidly degenerate that it is useless as an "improved."

The higher types of roadway may be left for varying periods of time without attention and while this results in the end in being a more expensive method of treatment it is only a loss of money, you still have the road which may be repaired, but if you attempt this sort of treatment upon your cheap surface you eventually lose your highway entirely.

My experience is that a patrolman with a horse and cart, an efficient drag or hone and the willingness to work will keep in almost perfect condition from 5 to7 miles a cheaply constructed roadway, at an approximate cost of from $175 to $200 per mile.

Given the same mileage of the higher types of road he will require a helper, a much larger equipment and if working upon bituminous roads probably not less than $150 per mile for material in the way of bitumen, crushed stone, etc.

My average cost of maintenance upon the higher types of road including the use of a blanket treatment once in two years will not be less than $500 per mile, and in many instances it will greatly exceed this. On the expensive road also you are constantly facing the fact that within a reasonable number of years you must resurface at a cost approximating $6000 a mile, while upon your cheaper road, if properly patroled, you will find that your surface material is thicker than it was at the time the road was built and has been in practically perfect condition during the entire period.

If the dust nuisance upon your cheaper road becomes intolerable it may be alleviated greatly and practically removed by the application of light bituminous oils or tars. The objection of this treatment, however, being the tendency on the part of a patrolman to allow the road to get out of section by neglecting to drag it after every rain, as he does not wish to destroy the skin coating on top, which is left after the treatment.

The cost of this treatment adds about $150 per mile to the cost of maintenance and on the whole is not as satisfactory for light travel in its final results, as adhering to the use of the natural soil and the regular treatment by dragging.

Road problems may be roughly divided into four sub-divisions, and their order of importance is about as follows; drainage, alignment, grade and surfacing.

It is unfortunate that to most people the latter is more important, while relatively it is of far less importance than the other three. The surfacing material is frequently considered paramount and the settling of the question as to whether you have a bituminous road, penetration method or mixing, a concrete road, or a pavement type is the main subject of discussion and with far more attention given to it, than in my opinion it rightly deserves.

Your drainage, alignment and your change of grade are permanent features. The surfacing can never be permanent. I have sometimes wondered whether a bond issue to be paid for by posterity should ever be expended on any feature that is not permanent.

Concededly, surfacing of all kinds will require not only constant maintenance but rebuilding. With the essentials fully attended to it is surprising how the surfacing may be maintained at a comparatively small cost. I believe that it is as necessary for us to turn our attention to the economic side of the road question as to the scientific. A highway must have an economic road rental, as well as a fixed road maintenance and wherever the actual cost plus its maintenance exceeds its rental value we are wasting money in building too

expensive a road. We must so adjust the scales that our costs are such as to provide a roadway for the traffic at the least possible expense.

I realize that this a very sketchy treatment of the subject given me. It is not scientific, but it equally is not theoretic. Financial problems in a state with a very small assessment roll and a large road mileage has made it a necessity in my state.

In order to accommodate a large tourist traffic we must have reasonably good roads and we cannot afford the kinds of roadway that are being built in many of the richer states. We have met the problem, as I have outlined in a rambling way, and it is satisfactory to us. It seems to me that there are many other states which might well adopt a plan of more mileage at less cost to their great financial benefit and to the comparative satisfaction of their residents and visitors.

A Simplified System of Highway Accounts

By FRED BUCK

Assistant Deputy Commissioner New York State Highway Department

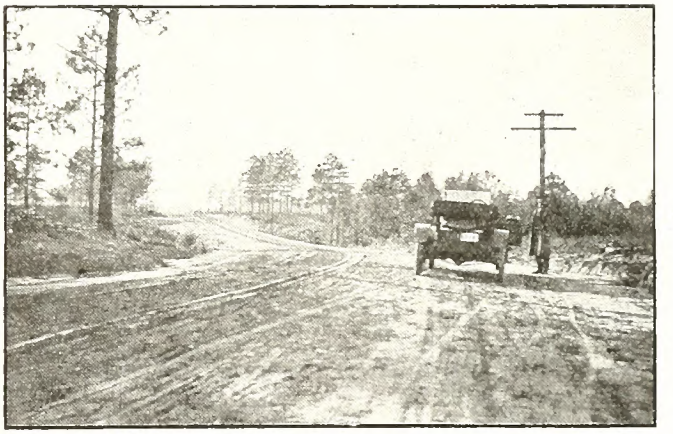
IN CONDUCTING the work of any town highway system which is organized as a distinct branch of a state system the fact must be constantly borne in mind that, in order to secure the best results possible, simplicity must be the watchword. The comparatively great volume of mileage, the extremely small average amounts available per mile and the agencies through which these amounts must be expended all demand a close adherence to plain and simple methods in all stages of the work, and fully as much in the accounting as in any other branch.

By adopting a system of town highway accounts which can be easily followed by the local officials in charge of the work, two important results are accomplished: First, a complete and accurate accounting of funds expended is secured, and, second, the lessons of order and system learned in this are carried, perhaps in the majority of instances unconsciously, to other parts of the work and a more orderly and systematic management of the whole is secured thereby. Careful and systematic methods in one part of any enterprise will induce the same effort in other portions just as surely as lax and inefficient methods, if allowed to obtain a foothold, will spread from one section to another and gradually seriously impair or destroy the efficiency of the whole.

The system of town highway accounts which went into effect January 1, 1909, as a part of the present highway law of New York State has proven very satisfactory, and excellent results have been obtained under it. In order to clearly understand the workings of this system it must be remembered that the funds for town highway work in New York State are derived from two sources: First, a tax levied by local officials upon the several towns, this tax being supplemented by moneys paid by the state to the towns for the same purpose, which moneys are known as "state aid," the amount payable to each town being dependent upon the assessed valuation per mile of highways of the town and the amount raised by the town as the highway tax in each year. These moneys combined form what is known as the highway fund.

In the prosecution of the work the town superintendent of highways is the man in charge. He hires the men and teams, purchases materials, directs the work and acts as paymaster; the paying, however, being done by means of vouchers issued by himself as town superintendent, the vouchers being redeemed in cash by the supervisor (who is the chief fiscal officer of the town) and retained by him as a receipt for money paid until the close of the fiscal year, when, upon rendition of his annual report and its acceptance by the town board, these vouchers are filed with the town clerk and become a part of the permanent records of the town. These vouchers, which are furnished to all towns by the State Highway Department, consist of a printed form with the necessary blank space for the insertion of the date, the name of the payee, the dates on which service was rendered, the number of hours of service or quantity of material, as the case may be, and the road for which it was furnished. Each voucher is attached to a stub upon which are blank spaces similar to that of the voucher.

The supervisor is provided with a supervisor's account book, printed and ruled to receive an entry of each voucher paid, spaces being provided for data relative to the voucher corresponding to that in the body of the voucher itself. Pages are provided at regular intervals for a recapitulated statement of vouchers paid, the data upon these recapitulated pages being finally carried forward to a single page thereon condensed into a form of statement, which is the annual report of receipts and disbursements required of each town supervisor under the highway law. Blank forms are provided for such additional copies of this report as are required to be furnished to the county superintendent of highways, the state highway commission and the state comptroller.



Fine Dirt Road in New Hanover County, N. C., Built Under the Supervision of Mr. R. A. Burnett, who appears in the picture.

No other books nor accounts are necessary for the town superintendent of highways or the supervisor in properly receiving, disbursing and accounting for the highway moneys of any town than those which have just been described. With practically no exceptions the town officials are pleased with the form of accounting, and errors and mistakes have been reduced to a minimum so small as to be almost a negligible quantity.

Partial audits of the highway accounts of any town are made by a representative of the state highway department at any time during the year when for any reason it shall be deemed that the same is necessary or expedient. By doing this many errors are prevented which might otherwise occur and unwise or extravagant expenditures are prevented, or checked if begun.

Each year a complete audit of the highway accounts of each town in the state is also made, and it is found that the form of voucher and manner of accounting for the same provided for the supervisor greatly simplify and facilitate the work of the auditor.

It is pleasing to be able to state that, while the audits of the first year in which this system was put in operation showed a large amount of errors and discrepancies (due, mainly, to unfamiliarity with the system or to carelessness in making entries) the audits of the years since the first show a constantly decreasing number of inaccuracies. It is also pleasing to be able to state that extremely few instances of actual dishonesty have ever been uncovered and that in very nearly all cases in which reimbursement has been required the occasion for the same was due to ignorance or carelessless and not to actual dishonesty on the part of any town official.

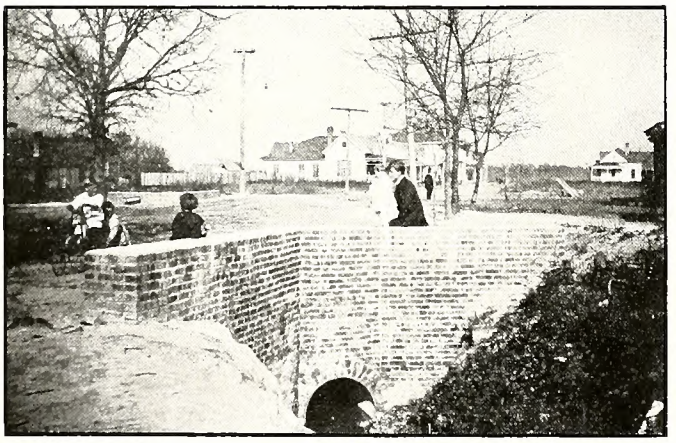
Those who have been most closely associated with the work are also firm in the belief that the quality of the town highway work of the state as a whole and the very excellent results secured have been contributed to in no small degree by the simplified system of town highway accounting which has been used in connection with the work.

Determination of the Value of Bituminous Construction

By C. S. REEVE

Chemist, U. S. Office of Public Roads

BITUMINOUS construction, after going through several years of experimenting and devolopment, has resolved itself into a few fairly well defined types, with which the average intelligent highway engineer has become, in a general way, familiar. The speaker, upon previons occasions before this association has dwelt upon some of the important minor details essential to successful construction, and will therefore now treat upon the various methods in a broader sense



One of the Newport Culvert Company's 36" Culverts in the Town of Selma, N. C.

with the further purpose of discussing in a general way some of the contributing factors in the selection of any given form of construction.

Bituminous macadam construction embodies two common types, i. e., that laid by the penetration or grouting method and that laid by the mixing method. It is perhaps unnecessary to enter into any of the details of either method, other than the mere statement of best accepted practice at present. In the penetration method, this consists in spreading over a well consolidated foundation course of crushed rock, gravel or concrete, a wearing course of crushed rock ranging in size from about that which will be retained on a one-inch screen to that which will pass a two-and-one- quarter inch screen. This course is laid to a loose depth of three inches, lightly rolled, and treated with a uniform application of hot bituminous material at the rate of one-and-one-half gallons per square yard. Clean stone chips are then spread over the surface to permit of thorough rolling and to fill the surface voids. A seal coat of hot bituminous material is applied at the rate of about one-half gallon per square yard, whieh is absorbed by a covering of clean stone chips and the road is finished by thorough rolling.

In the mixing method, approximately a one size stone is used as for instance particles whieh will be retained on a five-eighths inch screen and pass through a one-and-one-eighth inch sereen. A mixture of hot bituminous material and heated rock is prepared which should be of such proportion that every particle of rock is uniformly coated with bitumen. The mixture is spread to a loose depth of three-and-one-half inches, thoroughly eompressed by rolling, and then finished by a seal coat and clean chips followed by thorough rolling.

In addition to these two types of bituminous macadam, we have the bituminous concretes in which a dense aggregate is prepared by mixing sand with erushed stone or gravel of various gradings, and then mixed while hot with a proper proportion of hot bituminous material. The hot mixture is spread to a uniform depth over the foundation, thoroughly eompressed by rolling, and finished with a very thin seal eoat and clean chips or pea gravel. The seal coat is sometimes omitted when the density of the mixture warrants it.

While not strictly a method of bituminous construction, it is not uneommon practice to consider surfaec treatment as such for purposes of discussion and comparison when by surface treatment we mean the formation of a relatively thin wearing carpet of bituminous material and eoarse mineral matter as distinguished from the palliative effect accomplished by the application of thin fluid bitumens for the purpose of temporarily laying the dust. Surface treatment as above de-

A Convict Road Gang at Work in Buncombe County, North Carolina

fined is usually looked upon as a form of maintenance, but where it is planned and figured as a part of new construction, it must in the long run, justify its use by favorable comparison with the cost of maintaining other types of construction under similar conditions.

The above brief descriptions cover the most generally accepted methods for the application of bituminous materials to road construction. In addition to the above reference might also be made to bituminous sand and bituminous shell construction, but the sphere of usefulness of such types is limited to localities where the native raw materials predominate to the practical exclusion of others. It may be stated in passing, however, that interesting and helpful experiments have been conducted along these special lines with resultant improvement in the methods of utilizing the materials involved.

Now with these well defined methods of treatment under consideration, which one shall we adopt for a given road? Shall we build water-bound macadam with the ultimate purpose of maintaining a bituminous wearing carpet upon it or ought we make a somewhat higher initial outlay of funds and resort to a higher type of bituminous construction? Which is destined to yield the best and most economical service in the long run? The positive answer to these questions backed by absolute figures is not forth-coming at present, for the reason that, in our efforts to bring about any form of urgently necessary highway improvement, we have in most instances failed to assemble the valuable data which might have been obtained from our completed work. Since, however, our methods have become fairly well established it is noted that the problems of selection are receiving more scientific consideration.

It is, of course, axiomatic to state that with material and ample funds available volume and character of traffic are the controlling factors in selecting or eliminating from consideration the type of construction, but unfortunately we usually must deal in generalities when discussing traffic conditions. We speak of light, medium and heavy traffic but what might be considered light traffic in an urban district would be classed as heavy traffic in a rural section, and such general designations take no consideration whatever of the relative proportion of motor driven to other kinds of traffic. In order to intelligently study the work thus far accomplished and to provide for the future, we need tangible figures along these lines and the systematic traffic census should become a more important part of our highway engineering than it has been heretofore.

The Office of Public Roads now has under observation about twelve miles of experimental road in Montgomery county, Maryland, which includes various types of bituminous construction and surface treatment; in the course of a few days work will begin on another series of experimental sections over five miles in extent in Alexandria county, Virginia. The traffic census is an important part of the data which is being secured, and this information is strengthened by the addition of accurate maintenance data. There is thus obtained an

exact measure of the actual damage incurred by the road surface through the passage over it of a certain volume and character of traffic. It may be of further interest to note that in order to make this information comparable with that obtained from the observation of other roads coming under the jurisdiction of the office, the practice of reducing all traffic to tons has been adopted, and the maintenance cost of a given section may then be expressed in cents per ton mile or ton miles per one cent of maintenance. This yields a figure which really has some tangible value to the student of the subject. For instance, during 1914 on the nine miles of experimental surface treatment on the Rockville Pike, Section 3 carried 243,117 tons of traffic at a cost of .2171 cents per ton mile while Section 4 carried the same traffic at a cost of .0613 cents per ton mile. In the first case only 4.6 tons miles were carried for one cent of maintenance while in the second case 16.3 tons miles were carried for the same amount. The traffic was approximately 71.7 per cent motor driven. The difference is due to the fact that Section 3 had a cold surface treatment which, as was anticipated, had to be renewed during the year while Section 4 had a hot surface treatment which would not require much attention throughout its first year. The figures thus far obtained are in no sense final, but are indicative of the comprehensive valuation which may be obtained through this method of expression. Then, having the approximate tonnage and traffic classification which a given highway is to carry, we should be enabled with assembled data of the above character to more intelligently select an economical type of construction.

In computing maintenance costs a maximum cost per ton mile should be found which it will not be economical to exceed. Such being the case when existing water-bound macadam begins to show evidence of excessive wear, it should be maintained by surface treatment until this maintenance cost is exceeded and then scarified and resurfaced with a more durable type of construction.

At present we are largely guided by somewhat general experience and observation so far as traffic is concerned. We know, for instance, that surface treatment is not well adapted to mixed traffic in which the horse-drawn greatly exceeds the motor driven. We know, however, that proper surface treatment is rather well adapted to withstand motor-driven traffic or a limited volume of mixed traffic in which the motor-driven predominates. We are, moreover, beginning to obtain more definite information along these lines. As a general proposition, however, it may be said that unless a surface treatment can be maintained practically intact by a light annual application with but few minor repairs during the year, it will prove more economical in the long run to resort to some higher type of bituminous construction.

This seems to have been particularly well illustrated in experiments at Chevy Chase, Maryland, where surface treatments and penetration construction may be observed under the same conditions. The frequent repairs to the surface treated sections gradually destroys the uniform cross-section of the road, and their expense together with that of annual surface treatment soon brings the total cost close to that of the penetration sections which have required but little expenditure for repair since their construction. In fact, it is the speaker's contention that bituminous construction by the penetration method may sometimes cost but little more than surface treated macadam under the same conditions, and there are conditions under which the former will certainly not have cost any more than the latter at the end of an elapse of three years. The difference in cost between water-bound macadam and bituminous penetration macadam is rarely more than additional cost of the two gallons of bituminous material. The cost of heating and pouring this material is practically offset by the large amount of sprinkling and rolling which is required for water-bound work. With a high watering charge and a low bitumen cost, the costs of the two forms of construction converge to a point where the additional cost of two or three annual surface treatments will make the cost of the surface treated macadam equal or exceed the cost of the other. A consideration of such factors may prove a strong influence in selecting a type of construction.

The character of the local rock may also influence one's decision. It is believed that some rocks which are unsuitable for water-bound construction may frequently be utilized to advantage with a bituminous binder, and one object of the coming experiments in Alexandria county will be to demonstrate the possibilities of an average sandstone, gneiss and granite for bituminous construction. That the type of rock available may prove a determining factor in the selection of the form of construction to be followed is well illustrated by a recent proposition upon which advice was sought. Briefly, the decision hinged upon the relative economy from a standpoint of economy and durability between importing limestone to build water-bound macadam which would afterwards be surface treated or utilizing local hard sandstone and building bituminous macadam by the penetration method. Under the circumstances, the latter form of construction was recommended as being probably cheaper in first cost and cheaper to maintain.

Such cases as the foreging may be disposed of with comparative ease, and the accumulation of comprehensive data should enable us to more readily solve the more difficult problems. The majority of us now have it within our reach to observe and study the more improved forms of construction, and we should lose no opportunity for profiting by the experience we are thus enabled to gain. It is only by so doing that we can hope to justly and positively select the form of construction or treatment that is best adapted to our requirements.

The county farm demonstrators of Virginia spend two weeks once a year at the Virginia Polytechnic institute, over sixty of them; and this year the Blacksburg board of trade banqueted the demonstrators in the dining hall of the State Experiment Station. President Eggleston took advantage of the occasion to point out that the Blacksburg board of trade was responsible for the various good macadam roads which radiated from Blacksburg into every section of Montgomery county. The entire good roads movement in this county had been led by the board of trade, which had also fostered a co-operative spirit between towns people and country people, harmonizing the differences which too often existed between the interests of the different sections. There are few towns or cities in Virginia, where so much has been accomplished under the efficient management of such a capable body of men.

Alexander county, N. C., will hold a second bond issue election this month, the proposition being the issuance of $150,000 of bonds for road building. The first election, held several months ago, failed to carry.

Maintenance of Earth Roads

By GEORGE W. COOLEY

State Highway Engineer of Minnesota

I BEG PERMISSION of the Program Committee and the delegates present, to change the title of my paper from "Maintenance Methods and Relations to Traffic" to "The Maintenance of Earth Roads." This change is made for various reasons:

First, we all know, either through our own experience or from the experience of other investigators, that the economic value of a highway depends to a great extent on its surfacing, and the care with which that surfacing is kept up. The nature of the material used for surfacing, its value as to hardness, toughness and its recementing quality is generally determined from the conditions of each individual case, but one factor remains forever the same, one rule must be continually in force, and that is a continuous and thorough system of repairs and maintenance. Without the careful carrying out of such a rule, the best of roads will deteriorate, the cost of transportation will become greater with each day's neglect, and our road will become a liability instead of an asset. By far the greater proportion of our roads, especially those in states having a large mileage and a moderate road fund, are the common ordinary earth roads either built entirely from the material at hand or covered when permissible, with a surfacing of gravel, sand, stone or clay, as necessities warrant, or conditions permit.

In the consideration of this subject, it is presumed that the fundamental principles of road construction have been followed, i. e., that an ample drainage system has been provided, and that the sub-grade or foundation has been built up without the use of perishable material. Unless our road has been so primarily constructed, weak spots will develop when the drainage is imperfect or where sods or vegetable matter has been used in its construction, and the cost of proper maintenance will become excessive.

In the construction of a new earth road made in an open level or rolling country, the use of an elevating grader is quite common and under suitable conditions its use is justified by economy in construction work, but its value as a road builder is lessened if the two frequent result is obtained of casting the sods into the the road bed, and depending on the regular traffic to thoroughly consolidate the mass so built up. This can be avoided by the use of a tractor in hauling the grader, which thoroughly pulverizes and packs the material cast in by the grader.

We may safely take it for granted then that in any road bed carelessly constructed with a large percentage of vegetable matter, the future bills for repairs and maintenance will be governed largely by the quantity of unsuitable construction material used, and in case of a lax system of construction, a more elaborate system of maintenance must be adopted.

Overtopping all other road problems in its importance is that of maintenance. The destructive agencies of traffic and the elements are increasing in their activities, and it is idle to talk of permanent roads any more than to speak of a house, a fence or railroad ties as permanent. The public roads today, by reason of the exceptionally obstructive traffic conditions, are more costly in construction and this cost is continually increasing with the advance in the prices of labor and material. It is criminally wasteful, therefore, to invest large sums of public money in building the highways demanded by traffic, unless the investment is conserved by adequate maintenance.

We conclude, therefore, that continuous maintenance being such an important factor in the general scheme, especial effort must be made to install a satisfactory and economical system as soon as a road is opened to travel. In some of our western states, the plan has been suggested of requiring contractors on surfaced roads to provide for maintenance as soon as any section is completed, and continue the same for at least thirty days after the work is accepted, thus giving time for the engineering department to provide for the organization of a maintenance crew without overlapping or interfering with the work of construction; and in Minnesota the plan has been adopted in the construction of earth roads to require the continual use of a drag or planer on grade building. This latter plan has been found very efficient and renders future work on the surface less expensive, besides tending to produce a more compact road bed. The tool found most satisfactory in this work is that known as the "Minnesota Road Planer" which consists of the two blades of an ordinary road drag, fixed between a pair of runners about 14 feet long, the blades set at an angle of about sixty degrees to the runner and made rigid or adjustable as may be deemed best. The planer is hauled on a line parallel with the axis of the road and its operation is similar to that of the ordinary drag, with the additional advantage of making a smoother surface. The old style drag without runners has a tendency, especially on new work, to increase the "waves" or undulations frequently occurring on road construction, while the planer eliminates these faults, and as a general maintenance tool has proven the most satisfactory.

An important feature of maintenance is prevention of the growth of sod and weeds along the travelled track. When sod is allowed to form along the highway, it has a tendency to catch the dust and wash from the road surface, and soon becomes a high tough shoulder, preventing drainage. The use of a spring tooth harrow along the roadside two or three times a year will prevent this growth.

The state of Minnesota has given special attention to the matter of maintenance and in the present road laws have made adequate provision for the care of all roads. Township and county roads constitute approximately 90 per cent of the road mileage of the state, and of these roads, about 90 per cent are earth roads. To care for the town and county roads, a one mill tax is levied on all property in the town the proceeds of which constitutes the town dragging fund. This fund is expended under the direction of an overseer, appointed by the town board, for the purchase of drags, and in dragging all roads of the town, excepting state roads. This appears to be the most satisfactory method of caring for the earth roads under control of the local authorities, but there should be a provision in such cases, for general supervision of the work by the county highway engineer.

For the care of state roads in Minnesota, 20 per cent of the state road funds, with a due proportion of com-

A paper read at the Fourth American Road Congress, Atlanta, Ga., Nov. 9-14, 1914.

ty funds, are set aside and may not be used for any other purpose than maintenanee of state roads. As the state roads include all types of eonstruetion, different systems of maintenance have been required in the different localities. In general, three systems have been established: The patrol system on maeadam and well built gravel roads, and the maintenanee section system, and road drag system on other roads, all being under the direet supervision of the district highway engineer.

Under the patrol system, one man is assigned a seetion of from 5 to 7 miles of road and works with hand tools. It has been found neeessary to supplement this work with the occasional use of a team and in that manner it has proven satisfaetory on macadam and gravel roads.

Under the maintenanee section, one man is given charge of a section of from 20 to 30 miles of road and is employed continuously with his team on the care of his section. He is given authority to employ additional help, both teams and men, and usually has two teams and four or five men at work. Contracts are also entered into by the section foreman with residents along the road, for the dragging of same after each rain, or when ordered to do so by him. The section crew takes care of all minor items of construction, such as placing culverts, etc., and we have found that the work when properly done, is really of a constructive nature. This system is without doubt the most effective, and is being adopted generally throughout the state.

The dragging system requires the employment of a superintendent of maintenance, who for convenience should be one of the engineer's assistants, whose duty is to contract or make arrangements for the dragging of all roads under his charge, and to see that the work is done at proper times. This system is suitable for slightly undulating prairie country, where most of the roads are of earth, and to get best results, the superintendent should have at his disposal light graders to reshape the road bed at least at the beginning of each season.

On earth or gravel roads, no maintenance system is complete which does not contemplate the use of planers or similar deviees, and a combination of work as outlined under the seetion system is reeommended.

Transcontinental Tour Over "Old Trails" Route.

Under the auspiees of National Highways Assoeiation, the National Old Trails Road Association and the Automobile Club of Southern California it is proposed to run a transeontinental tour, over the Old Trails route leaving New York about the middle of June. The tour will be under the management of Elias Vander Horst and A. L. Westgard, vice-presidents of National Highways Assoeiation and eommittees will be appointed from all the associations under whose auspiees the trip will be held to assist in making the trip a suecess. Mr. Westgard, who has made ten transcontinental trips, will personally conduet the trip. He says the Old Trails route has been seleeted for the reason that it is the most scenic and historic. You visit eave dwellings, pueblos, Mexican villages and the oldest house in the United States, built in 1530. You cross the seenic Raton Pass, drive through the Petrified Forest, visit the Grand Canyon and see the interesting desert vegetation. The roadway and hotel aceommodations are the best of any transcontinental route.

Only new, seven passenger cars will be used and as only four passengers will be taken in each car the capacity of the trip is necessarily limited. Thomas Cook & Son will have charge of the hotel accommodations. Further information may be obtained from 18 Old Slip, New York City, the headquarters of National Highways Association, or from any of the associations under whose auspices the trip will be made.

Whitley county, Ky., will vote April 24 on the question of issuing $250,000 of bonds for road building.

Building a Top Soil Road in Edgecombe County, North Carolina. Engineer Hathaway, of U. S. Office of Public Roads, in Charge

The Automobile in the South

The Ford Motor Co., of Detroit, announce that they will build a big factory in Charlotte, N. C., to cost about $250,000. The factory will employ about 2,000 men and will be ready for business in about one year. This step is taken because of the immense increase in the use of Ford cars in the South and other big automobile manufacturers may be expected to follow suit. The South is the biggest field on earth for the manufacturers of automobiles and they are beginning to realize it.

* * *

A Million Fords.

With the completion of the 300,000-car schedule Aug. 1, 1915, there will be one million Ford cars in operation. A million Ford owners mean Ford dealers in proportion. There are nearly 6000 Ford dealers. And in the hands—always—of these Ford dealers is kept a stock of Ford parts aggregating about $12,000,000.

* * *

The Louisville Automobile Show.

The big automobile show held at Louisville, Ky., last month, beginning Feb. 1, was a great success from every stand-point. There were 150 cars on exhibition, practically every American car, and the total value of the cars shown was close to half a million dollars.

Fifteen different makes of motor trucks were on display and these attracted no end of attention.

The show drew the crowds. It is estimated that more than 30,000 people saw the exhibits and hundreds of sales resulted. There was fine music at intervals and several dances were given during the week.

* * *

The original model Oldsmobile, which was constructed several years before the earliest types of motor carriages made their appearance, has been presented by the Olds Motor Works to the Smithsonian Institute.

This is commonly looked upon as the grandsire of the motor car business. It was designed and built, or laboriously hammered and molded out of metals in Lansing, Mich., in 1894 and 1895. About the aged relic is woven the romance of more than a quarter of a century of struggles, tragedies and successes which marked the formative period of this great industry. Plans laid as far back as 1885 for building the vehicle, which originally was to have been propelled by steam, but did not materialize until the spring of 1894, and experiments during this lapse of time proved to the builders the efficacy of the gasoline motor.

* * *

Remarkable evidence of the stability of the demand for motor vehicles is found in the record of exports from the United States for the calendar year 1914. Official figures just issued, as analyzed by the National Automobile Chamber of Commerce, show that the value of motor trucks exported last year represented an increase of more than 432 per cent over 1913, and that the value of all motor vehicles exported in 1914 was more than 5 per cent greater than in the previous twelve months.

This record is all the more notable in face of the fact that there was a decrease of 15 per cent in valuation of all exports for last year and a decrease of nearly 20 per cent in the value of all exports of manufactures ready for consumption, automobiles included, representing 30 per cent of the total exports for the year.

In 1914 the United States sent abroad 3,430 commercial vehicles, valued at $8,985,753, as compared with 1,000, worth $1,686,807, in 1913. The total of motor vehicles exported last year was 25,765, worth $28,507,404, as against 26,889, worth $27,030,451, the year before.

Imports of motor cars dropped from 492, valued at $1,154,873, in 1913, to 296, valued at $493,305, last year.

* * *

Some people have the impression that tires pumped up hard will roll easier and thereby cause a greater mileage per gallon of gasoline as compared with softly inflated tires. Recent tests have proven such is not the case, and that, on the whole, the underinflated tire will show better mileage of gasoline, the theory being that the soft tire will wrap around bumps and road obstructions, while the tire, if hard, will mount them, thus consuming more power.

* * *

Not So Far Wrong, Perhaps.

It is related that a Texas lady purchased a new car and before she had time to become familiar with automobile talk she wrote a letter to a friend in which she had this to say about her car:

"Our car is the very latest 1915 model and is equipped throughout with improved annular ball bearings. It is a lean line body, with dispatchable and denounceable rims, epileptic springs in front and flat iron springs in the rear, full sloping rear axle, most infernal expanding brakes, electric stopper and starter, autocratic glass front, uniced power plant, flash jubilation, free point detention, sailor radiator, three speeds horrid and one perverse, amateur on dash goard, gasoline tank asleep, 60 mile speedy greater, aggravated ebony rim, licorice lights, and horn trimmers, frigid suspenders, hand-cuffed leather upholstery, dippy curtains, bar type foot rest and all the other latest susceptibilities."

* * *

Pending the erection of an additional factory of its own, plans for which are now under way and for which a site has been selected, the Briscoe Motor Company has just completed negotiations by which it secures the plants and equipment of the Cutting Motor Car Company, at Jackson, Mich. The production of Briscoe cars has reached a point where its two plants are unable to take care of the demands of dealers, and further provision was required to take care of the rapidly increasing business. Says Benjamin Briscoe, president of the company: "Whereas every American automo-

bile manufacturer has followed the long-established custom to warehouse cars during the winter to finance himself over the dull season and to prepare for the spring rush of business, we find ourselves in the very fortunate position of having all the business we can handle. So, in order to take care of the impetus which always comes with the approach of warmer weather, we not only took hold of the Cutting plant, but prepared plans for the building of a strictly up-to-the-minute factory here in the teeming city of Jackson during

Building a Top Soil Road in Dinwiddie County, Virginia.
Photo by U. S. Office of Public Roads.

the spring and early summer. According to our plans, our 1916 output will be three times that of the present season, an increase amply justified by the business which is coming to us from all parts of the country."

* * *

No matter what the ultimate effect on the industry at large, one present effect of the war has been to turn large quantities of orders into the hands of materials producers and parts makers. In one or two instances so great has become the pressure that double shifts have been resorted to. Which, in the face of so many predictions for a lean year, is a benefit that undoubtedly will be felt to some extent in many quarters.

* * *

When automobile and aviation motors are to be tested for brake horse-power at the Royal Technical college at Breslau, Germany, they are now mounted in a pendulum frame which has been designed and built at the laboratory of the institution, and the reaction of the frame upon a balance beam device serves for measuring the forces applied in a manner which has been found accurate and convenient.

* * *

Spark-plug leakage is a frequent, and usually unsuspected, source of power loss. Most plugs have a tendency to leak when run very hot, and for this reason it is well to make an occasional test at the end of a run by dropping a little oil around the packing joints and watching for bubbles. With a good plug such leakage can usually be obviated by taking up the packing gland.

* * *

Americans have not attempted to enter the market for motor trucks in Turkey. Most of the trucks so far sold have been bought by the army and it was reported that the ministry of war would soon be prepared to receive bids and try cars submitted as samples, with a view to purchasing 100 motor vehicles of various sorts. The trucks previously purchased have had a capacity of two to five tons and of ten tons.

* * *

In 1912 Argentina imported from Germany automobile accessories to the value of $405,000, and 627 automobiles. The same year France supplied the Argentine republic with $389,000 worth of accessories and 1,651 cars, and Belgium furnished 295 cars.

* * *

Private garages of hundreds of wealthy refugees and other residents of Mexico City, Mexico, have been pillaged of automobiles during the last several weeks. Many cars have also been confiscated by army officers and federal employes.

* * *

The Grand Palais, where all the French motor shows are held, is now used as a distributing camp for the different regiments fresh from the training camps in the south and center of France.

* * *

Destructive Strain.

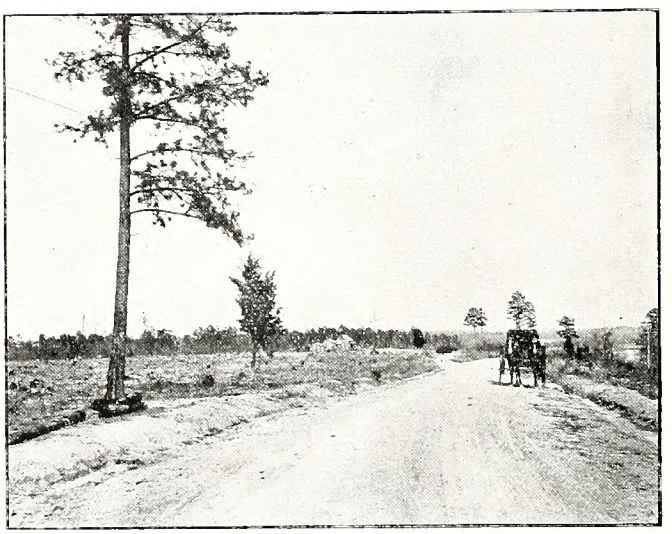
Letting the clutch in suddenly to get a push in overcoming road obstructions, such as mud or snow, puts a destructive strain on the parts between the engine and drive wheels.

* * *

Motor Vehicles in Kentucky

By H. L. RAMSEY
Secretary Louisville Auto Club

The automobile in Kentucky has experienced in 1914 its most prosperous year. The registrations in the office of the Commissioner of Motor Vehicles showing an increase over the year 1913 of automobiles alone of 92



Fine Top Soil Road in Dinwiddie County, Va.

per cent. and if motorcycles are included the increase is 73 per cent.

The total registrations for the year 1914 were 12,574. The average fee is about $8 ($7.93 to be exact), and at this rate the present motor vehicles in the state contribute to the state road fund revenue about $100,000 per year. If the same proportion of increase is maintained it will be but a few years until the automobiles will

pay as much to the state roads as the much-discussed 5-cent tax, which was enacted by the last legislature.

The present law, Chapter 69 of the Acts of 1914, provides that all licenses issued shall be renewable on January 1 of the succeeding year. This, however, does not apply to licenses issued in 1914 before the new law became operative. These run for one year from the date of issue, as provided by Section 2, which reads as follows:

All licenses issued after the passage of this act or before January 1, 1915, shall be made to expire on January 1, 1915, and the fee for such license shall be proportionate to the time that the unexpired part of the year 1914 bears to the whole year, and in making the calculation the time shall be calculated from the first of the month succeeding the date the license shall fall due. If any licenses have been issued before this law becomes operative, which do not expire until after the first of January, 1915, the next license issued on such machine shall expire January 1, 1916, and the fee collected from such license shall be apportioned in the manner above provided for in the year 1914.

Under this law there were 7,217 licenses due January 1, 1915. Of these 4,534 have been issued, the total revenue therefrom being $35,982.70.

The noticeable features of the 1914 registration as compared with those of former years is the very large percentage of increase in the rural parts of the state. An increase of 500 per cent. to 1,000 per cent. is not unusual in many of the rural counties. The per centage of small, light cars has also largely increased. There is registered to-day about twice as many cars under 25 horse power as above. This is partly due to the tendency on the part of the manufacturers toward a small bore, long-stroke motor, but is largely the result of the demand for the cheap car.

There will be by January 1, 1916, 20,000 cars registered in this state, but this will leave Kentucky a virgin field for the automobile salesman as compared to many other states. Iowa, for example, has practically the same population as Kentucky and there are at present registered in that state 103,000 automobiles. The statement has been made in Louisville every year about the time of the Automobile Show that the day of the automobile is just beginning; the state has made a good beginning with its 12,500 cars, but it is still 'a long way to go' before we catch up with our sister states.

Arthur H. Blanchard, M. Am. Soc. C. E., Consulting Highway Engineer and Professor in charge of the Graduate Course in Highway Engineer at Columbia University, on February 9th delivered an illustrated address on the subject "Economic Phases of Highway Engineering" before the Middletown Scientific Association at its meeting at Wesleyan University.

Mr. Arthur N. Johnson, M. Am. Soc. C. E., Highway Engineer, Bureau of Municipal Research, New York City, on February 5th delivered a lecture on "Methods of Cost Keeping for Highway Engineers and Contractors" before the Graduate Students in Highway Engineering at Columbia University.

On the Central Highway in Buncombe County, North Carolina.

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NOTHING DOING.

Prospects for progressive road legislation in North Carolina are very poor now. North Carolina's lawmakers have a way of putting off everything to the very last minute and only get a move on when the close of the "paying" part of the biennial legislative session is near. The solons draw pay for 60 days and get nothing for over-time. They want to make sure of drawing every cent of the cash that is coming to them and fearing that they will "work themselves out of a job," they side-track legislation and delay and kill time until they see that all of the sixty days will be used up and then they go at it with a rush. Hundreds of bills are passed during the closing days of the session and scant consideration is given them. The bill for the state highway commission was caught in this jam and at last accounts the $30,000 annual appropriation, which would have made the commission a real force in the state, had been cut down to a beggarly $10,000 and the bill was still far from passage.

This de-horned and denatured bill may finally "serouge" through but it will be a mighty weak and miserable makeshift. It now appears that North Carolina will remain in the rear of the procession, along with the other seven unprogressive, backward states that as yet do not have state highway departments. It has been demonstrated beyond the shadow of a doubt that the only right way of building roads is under the supervision of trained engineers, provided by the state and directed by a central highway body, but who ever heard of a North Carolina legislature listening to reason and common sense? They don't legislate in that sort of fashion in the Old North State.

MORE MILEAGE.

Of late years the tendency among road-builders has been to adopt certain standards of construction and adhere strictly to such standards, regardless of consequences. This has resulted in many sections, where the amounts of money available for road work were limited, in the building of very short stretches of good road, leaving the remainder of the road mileage in bad condition. The idea of the road builders has been to build well, concentrating road expenditures on a few miles, rather than improve in a less thorough manner, the entire road mileage.

In this issue of Southern Good Roads Hon. S. Percy Hooker, state highway engineer of New Hampshire, takes issue with this idea and effectually demolishes it, according to our way of thinking. There may be cases where Mr. Hooker's ideas will not work satisfactorily but in the main we believe he is right and we commend his article to your careful consideration.

KENTUCKY WIDE-AWAKE.

It is indeed a pleasure to note the good roads activity now prevalent in the good state of Kentucky. We doubt if any state in the South, or any state in the nation, for that matter, can show show as much good roads enthusiasm and activity per square mile of territory. From Hon. J. B. McCreary, that fine old Confederate soldier who is the state's chief executive, down to the humblest official in the state's humblest county, every Kentucky road official is "on the job" continually.

Elsewhere in this issue appears a brief sketch of the road work planned for 1915 in Kentucky. Governor McCreary and Hon. R. C. Terrell, state roads commissioner, say that this program will be carried out and even more accomplished. The good roads leaven is working in so many remote communities and so generally throughout the state, that it has been impossible to get a line on all that is going on. The work set down in the short article referred to is the work that has been reported to headquarters and for which adequate provision has already been made.

If the other states of the South do not want to take Kentucky's dust this year and for years to come, they will have to hurry mightily.

Kentucky is up and doing.

That the Asheville-Charlotte Highway will be in condition for travel within the next two months is the statement of Dr. M. H. Fletcher, who has had an active part in the construction of Buncombe's link of the road. Dr. Fletcher states that the grading is nearing completion and that excellent progress had been made by the state's convicts who are kept busy in the construction of the road.

Florida Good Roads Association March 24 and 25.

A call for the annual meeting of the Florida Good Roads Association signed by W. J. Hillman, honorary president, F. O. Miller, president and J. P. Clarkson, secretary, has been sent out. The call reads as follows:

All members of the Florida State Good Roads Association, and all persons interested in road improvement and the securing of a system of highways throughout Florida, are invited and urged to attend the annual meeting of the Florida State Good Roads Association, to be held in the city of St. Petersburg, Florida, Wednesday and Thursday, March 24 and 25, 1915.

The 1915 meeting promises to be the most important in the history of the organization. The legislative committee of the association will report, submitting a draft of a proposed bill providing for the creation of a State Highway Department for Florida, which is one of only seven states having no such department. The prospects are brighter than ever before for the passage of the proposed bill. A campaign of education, having as its object the unifying of sentiment in favor of Good Roads Legislation, has been carried on since the first of the year and a number of members of the 1915 session of the Florida legislature have promised their support of the measure. Reports will be made by other important committees and the meeting will be of great interest to all.

All members of the legislature, all county commissioners, county engineers, and others interested in Highway Improvement, are especially invited to attend the 1915 convention of the Florida State Good Roads Association.

The St. Petersburg Board of Trade and the people of that progressive municipality—"The Sunshine City of Florida"—are arranging an attractive program of entertainment, which will not conflict with the business sessions. There is much to see and to enjoy and all who attend are assured of a pleasant and profitable meeting. The full program will be announced later.

The motto of the Florida State Good Roads Association is "Improved Highways for the City, County, State and Nation," and the association stands committed for "A State Highway Department for Florida and Working of Convicts on Public Roads." Every white person, resident or non-resident, male or female, approving of the objects of the association is entitled to membership, but only those whose annual dues for the current year are paid are entitled to active participation in the annual meeting. The dues are only one dollar a year. Membership cards will be promptly forwarded by the secretary to all who send in applications, accompanied by the membership fee of one dollar, prior to the date of the annual meeting.

Big Sandy Good Roads Association at Ashland, Ky.

Enthusiasm characterized the meeting of the Big Sandy Good Roads Association, which held a two-days' session at Ashland, Ky., last month. Delegates were present from every county in the valley of the Big Sandy, more than 200 affixing their names to the register and offering credentials. The opening address was made by Judge J. H. Wade. Robert E. Wood, former postmaster of Louisville, spoke as the representative of the National Highway Association.

Other speakers were Commissioner of Roads R. C. Terrell; O. M. Clark, Philadelphia, who presented the advantages of concrete highways, and Judge Stallard, of Pike county, who talked of "Through Boyd county to the Breaks."

Addresses of welcome were made by Mayor Saulsberry and L. B. Hager, with a response by Judge Vaughn, of Johnson county.

Kentucky's Program for 1915.

One of the finest good roads meetings that has been held in the south in years was held at Louisville, Ky., last month when the Association of County Engineers of Kentucky got together for a two days' session. The attendance was large and great interest was manifested in the many excellent addresses delivered.

Kentucky is planning great things for 1915. Four roads are to be built, the Boone Way, from Cumberland Gap to Lexington, the Sandy Valley Route, from Pound Gap to Ashland, the Lincoln Road, from Louisville to Nashville, and the Jefferson Davis Road, from Bowling Green to Paducah.

The state's 1915 road building program includes the following:

800 to 1,000 miles are planned.

$1,700,000 will be expended.

$600,000 to be paid out by the state.

Bell, Greenup and Lewis counties have voted bonds.

All counties desiring state aid must make application by March 4.

Sixty-two of the 120 counties have applied.

These counties have applied for aid:

Anderson county, 53.3 miles, $12,000; Menifee, 5 miles, $2,500; Clinton, county seat to Wayne county line; Larue, 5.5 miles, $2,600; Mercer, $15,000; Franklin, inter-county seat highways; Trimble, 21 miles; Davies, intercounty seat highways; Campbell, 19 miles; Hopkins, 6 miles; Henry, 58 miles; Rockcastle, survey on Boone Way; Logan, 42 miles; Shelby, 47 miles; Jefferson, intercounty seat highways; Barren, intercounty seat highways; Madison, 9.5 miles, $10,000; Boyd, county seat to Greenup line, $15,000; Lawrence, intercounty seat highways, $12,000; Fayette, 15 miles, $12,000; Nelson; Scott, 4.6 miles; Owen, 32 miles; $10,000; Hart; Warren, 115 miles; Bourbon, 24.3 miles; Pulaski, county seat to Wayne and Lincoln lines, $21,000; Laurel, intercounty seat highways; Whitley, intercounty seat highways; Caldwell, 3 miles, $1,750; Oldham, 4.5 miles, $5,000; Carlisle, 14 miles, $5,000; Greenup, 120 miles, $200,000 bond issue; Monroe, 13 miles, $6,000; Letcher, 70 miles; Fulton, 21 miles, $10,000; Hardin, 39 miles, $12,000; Boyle, 50 miles; McCracken, 8 miles; Graves, 41 miles; Ohio, 61 miles; Nicholas, intercounty seat highways; Grant, 22 miles, Lexington and Covington pike; Russell, county seat Casey line, $5,000; Jessamine, 24 miles; Woodford, 29 miles; Boone, buy toll roads; Harrison, 14 miles; Lewis, $150,000 bond issue; Carter; Wayne, 51 miles; Union, intercounty seat highways; Pendleton, 30 miles, $3,500; Bullitt,8 miles, $2,500; Kenton, 4 miles, $15,000; Todd, 46 miles; Simpson, county seat to Allen and Logan lines, $8,000; Garrard, 17 miles, $10,000; Christian, 16 miles, ten partly subscribed; Johnson, $12,000; Mason, 52 miles, $12,000; Lincoln, 64 miles, $12,000; Bell, $200,000 bond issue.

Seven Counties Spend $7,000,000 For Good Roads.

The seven counties comprising Southern California will spend $7,000,000 this year in road construction. The schedule includes 324 miles of concrete boulevard, 145 miles of macadam boulevard, 160 miles of decomposed granite boulevard and 290 miles of desert highway.

Los Angeles county, which already claims the finest highway system in the country, will spend nearly half of the total named. It already has 404 miles of asphalt boulevards.

North Carolina Good Roads Association

The Good Road Mileage of North Carolina Counties.

Mr. W. J. Hardesty, of the Pamlico-Carteret Club of the University of North Carolina, prepared for a recent issue of the University News Letter a very interesting table showing the mileage of improved roads in every county in the state. The table is worthy of the close attention of every citizen of the state. It follows:

Rank. County.	Pc.	Improved (Miles.)
1 Scotland	88	266
2 New Hanover	76	95
3 Franklin	70	346
4 Hoke	70	140
5 Richmond	60	263
6 Iredell	57	231
7 Moore	53	320
8 Bertie	49	411
9 Rowan	44	200
10 Mecklenburg	39	393
11 Wake	34	343
12 McDowell	30	106
13 Guilford	30	219
14 Buncombe	28	157
15 Johnston	27	215
16 Haywood	24	29
17 Cabarrus	23	82
18 Gaston	23	116
19 Anson	21	119
20 Durham	20	144
21 Lee	19	45
22 Granville	17	124
23 Cumberland	16	65
23 Halifax	16	95
24 Alamance	15	93
24 Nash	15	129
26 Carteret	14	128
26 Currituck	14	15
26 Forsyth	14	138
26 Polk	14	43
26 Sampson	14	130
31 Brunswick	12	43
31 Vance	12	35
31 Wilson	12	86
34 Lincoln	11	45
34 Montgomery	11	50
34 Orange	11	34
37 Davie	9	28
37 Jones	9	39
39 Catawba	8	35
39 Martin	8	33
39 Robeson	8	75
39 Surry	8	31
43 Alleghany	7	20
43 Cleveland	7	41
43 Craven	7	38
43 Duplin	7	65
43 Harnett	7	55
43 Lenoir	7	35
43 Pitt	7	77
43 Rutherford	7	54
43 Washington	7	11
52 Cherokee	6	25
52 Edegecombe	6	43
52 Transylvania	6	12
55 Caldwell	5	35
55 Camden	5	10
55 Henderson	5	52
55 Madison	5	16
55 Randolph	5	20
55 Rockingham	5	35
61 Burke	4	11
62 Avery	3	19
62 Caswell	3	13
62 Northampton	3	18
62 Yancey	3	5
66 Beaufort	2	8
66 Davidson	2	15
66 Graham	2	5
69 Bladen	1½	3
70 Chowan	1	3
70 Stanley	1	7
70 Swain	1	4
70 Union	1	12
74 Stokes	5	4
74 Wilkes	5	4
76 Mitchell	4	2
77 Columbus	2	2

The following have no improved public roads that were reported up to January 1, 1914—all told, 7,903 miles of unimproved roads in these 21 counties:

Alexander, Ashe, Chatham, Clay, Dare, Gates, Greene, Hertford, Hyde, Jackson, Macon, Onslow, Pamlico, Pasquotank, Pender, Perquimans, Person, Tyrrell, Warren, Watauga and Yadkin.

* * *

Carolina's Good Road Message to Virginia.

Dr. S. M. Johnson is now in Richmond and bears a message from Governor Locke Craig of North Carolina to Governor Stuart of Virginia concernig the construction of the Southern National Highway.

The general assembly of North Carolina has adopted

resolutions conveying greetings to the legislatures of New Mexico, Arizona and California, and requesting that these states conjoin their efforts in completing the great southern road.

Dr. Johnson conveyed the resolutions to Governor Stuart for transmission to the general assembly, and will endeavor to have them acted upon. In order to emphasize the importance of the movement, Governor Craig sent Dr. Johnson as his personal representative, in the hope that a working arrangement might be effected whereby the strength of the eight states might be combined with that of the federal government in opening and completing the southern route.

Though a great part of it is already built, Dr. Johnson said that the Southern National Highway is not at present in condition to warrant inviting tourist travel. Comparatively small areas in Virginia, notably in Prince Edward county; in North Carolina, Tennessee and Arkansas are still unimproved, and practically impassable, said Dr. Johnson, and unless swift action toward their improvement be taken, it will mean the loss of millions of dollars when tourists begin their travels to the Panama-Pacific Exposition in California.

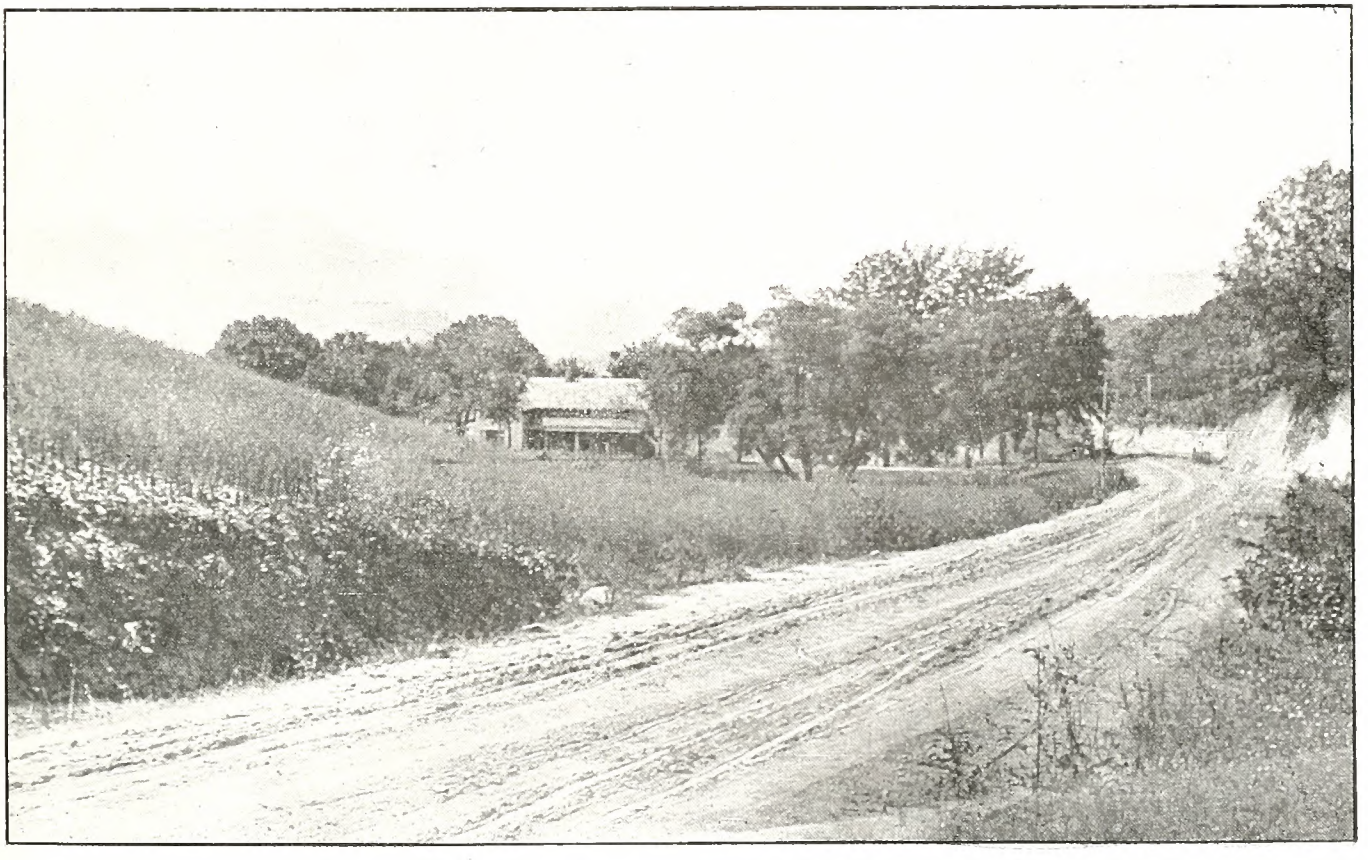
"The Southern Highway," said Dr. Johnson, "is in condition from Texarkana, Tex., to San Diego, Cal., except for a small stretch of sand between Yuma, Ariz., and El Centro, Cal. The state of California is now spending all its available highway fund in completing this stretch. It has given the southern route its strongest indorsement, as California considers this the best route to Southern California.

There is a splendid road from San Diego to Los Angeles and San Francisco. In all the other states the work is being fast completed. It seems strange that the most difficult problem should lie in completing some thirteen miles, principally in Prince Edward county, which are almost under the shadow of the Washington monument.

That thirteen miles is the most important stretch of unfinished road in the United States. It is the road over which, when completed, all the auto travel of the Atlantic Seaboard states, southward from Washington and northward from Richmond, must pass. Virginia has spent more than $1,000,000 in building her section of the Southern Highway, and has built her road to the Carolina line, all in the incredibly short space of about eighteen months.

"The Richmond-Washington Highway Corporation, of which H. W. Anderson is president has raised $42,000 in Richmond to help build this road across the country counties which have never recovered from the devastation of the war between the states. With all this done, there remains about thirteen miles, for the lack of improvement of which the south seems about to lose her rightful share of the tourist travel. And 1915 is a year of years, because of the two expositions on the Pacific coast, and the fact that the $300,000,000 which Americans annually spend in touring Europe must now be spent in some less hostile field.

Dr. Johnson said that it was a question of whether sufficient patriotism could be aroused to raise $25,000 to complete a road through what is practically a national cemetery, the most sacred ground the nation possesses—the battlefields through which the road shall run. He called attention to the fact that about $5,000,000 was raised by voluntary subscription for the Lincoln highway, and that the South responded generously to the call. He could see no reason why a fund should not be opened to popular subscription at once for the completion of the unimproved line in Virginia. If this be done, he believes that the Southern National Highway will be completed in time for the return travel from the Pacific Coast in October and November.



Fine Road in Buncombe County, North Carolina

Meeting of Va. Road Builders' Association

By GEORGE E. WRAY, Pilkinton, Va.

The fourth annual meeting of the body met in Richmond Feb. 9 and 10, under the presidency of Mr. W. F. Cocke. There were nearly 250 members present during the various sessions.

After the usual preliminaries, Mr. R. C. Stearnes, state superintendent of public instruction, spoke on road improvement in the relation to the public schools. He pointed out that France has enough first-class highways to encircle the globe fourteen times, while on a Virginia road the nearest and easiest way to reach the antipodes, is to go down through the mud and come out on the other side.

In France a horse will draw 3300 pounds for twenty miles over a rolling country while in Virginia one horse does well to draw 1,000 pounds on a level road. In reference to the broad highway which leads to the school-

HON. G. P. COLEMAN,
State Highway Commissioner of Virginia, President of the Virginia Road Builders' Association.

house door he held that the consolidation of country schools, a modern movement of great significance, depends wholly on the roads. Consolidation and transportation are inseparably linked together. Many leagues of stone and sand-clay roads had been constructed during the year and this had caused the enrollment of thousands of interested children.

Mr. G. P. Coleman, state highway commissioner, gave a forceful talk on necessary road legislation and among the recommendations made by Commissioner Coleman were provisions in the county or magisterial bond issue or in the general laws of the state providing for the maintenance of roads after they have been constructed, that the automobile tax be segregated as a maintenance fund, and that the law be amended so that all of the convicts from the penitentiary could be used on road construction work, and also that prisoners in county and city jails could be obtained for the same work.

Commissioner Coleman called particular attention to his letter to Governor Stuart recommending the grouping of the present prison population into four classes, the first to include all murderers and all prisoners whose records are known to be bad, and all prisoners sentenced for third offenses, these men to be worked in stockades and under guard in the stone quarries and lime-grinding plants of the state.

The second class of prisoners would be composed of short-term men, that is, men convicted for first offenses and such men from class 1 as by experience it is found can be trusted, these men to be worked under guard in the grading and actual construction of the roads of the state.

The third class would be composed of trusties taken from class 2, to be used as rollermen, enginemen, cooks, guards, etc., in the state camps, and in small gangs to shape road and lay stone.

Class 4 would be composed of paroled men to be taken from class 3 and paroled for good behavior at some period in their sentence on the recommendation of the state highway commissioner and the superintendent of the penitentiary.

In giving a general outline of the work of his department, Commissioner Coleman reported that during the twelve months ending October, 1914, the forces of the highway commission worked in ninety-six of the hundred counties in the state.

In that time the forces of the state and counties were employed on 403 different pieces of road construction, these various sections of roal varying in length from one-half mile to thirty miles. In this time the commission constructed of all classes of road, 855 miles, an average of a little over two miles to each piece of construction worked on during the year. In addition to this, the department had under contract in the same period 91 bridges, making a total of 484 pieces of work supervised by the engineers of the department. There were 30 convict camps at work in as many different counties, representing approximately 1,100 convicts and between 500 and 600 prisoners from county and city jails, making a total from all sources of from 1,600 to 1,700 prisoners who are employed by the state on road work.

Since the organization of the department the state has appropriated for road improvement in the various counties under the convict road law and the state money aid law, $2,316,000 (about $300,000 of this amount was derived from the automobile tax.) To this amount must be added the bonds issued by the various counties of the state, amounting to $6,675,100, making a total fund for road and bridge purposes of $8,991,100. Of this amount there remains on hand in the state and various county treasuries approximately $2,000,000.

The discussion which followed dealt with knowledge of cost of construction, and cost of maintenance; the necessity of proper laws to protect the heavy expenditures involved in maintenance as well as in construction; the automobile tax should be used for maintenance, as is now being done in many states where counties put up dollar for dollar, thus received from the state automobile fund.

H. G. Shirley, chief engineer, of Maryland, who spoke

on road maintenace, said that ninety per cent of the main roads of his state were rock improved, that every county seat was connected with every other county seat. The state had introduced some excellent road laws and the counties generally were co-operating for the public good. Their roads were almost uniformly good and fit to travel on every day of the year.

He said that where no provision was made for maintenance, any road would fall into a bad state; that it was absurd to build a good road and not provide ade-

A Bad Section of Road Near Fredericksburg, Va.

quately for its maintenance. He explained fully the method of road patrol, the power of the patrolman, his duties and equipment; also the methods of reporting and tabulating traffic. He then gave exhaustive figures on the cost of maintenance of the roads of Maryland for many years past and again urged that greater attention be paid to maintenance of improved roads.

Mr. C. B. Scott, assistant state highway commissioner, spoke on the need of strict traffic regulations, and said that Virginia must follow the lead of more fully developed countries in regard to control of traffic on her highways. He gave the status of traffic control in several countries of Europe and in some twenty states in the Union. Every board of supervisors should have full authority to adopt rules and regulations, subject only to the approval of the state commissioner. He also said that we are all but students in the matter of permanent road construction and maintenance and we certainly had much to learn in the conservation of the values put into road building.

Mr. C. N. Stacey, of Aurelia, followed and gave lengthily of the experiences of Aurelia road builders and road destroyers. His chief object was to secure legal protection to the roads after being built and the enforcement of stringent regulations.

Mr. Z. G. Durfey, superintendent, state highway commission, was introduced as a man who knew more about the construction and maintenance of sand-clay roads, common every day roads, than any other man in Virginia, or perhaps in the United States. He said that bad roads resulted when highways were made of clay without sand or of sand without clay; but given good tenacious clay, 15 parts, and coarse sand, 85 parts, well mixed together, under the guidance of a man of more than average ability, and the result would be a pretty good road. The chief ingredient in all good workmanship was brains; the roadmaker must be in love with his work and continuously on the job. He said that unless something was done soon the roads of the state would be ruined. The discussion following this talk by Mr. Hatcher, of Chesterfield, Va., and others was highly interesting and helpful. Mr. Copeland entered into the debate, all of which pointed toward more stringent laws and urged closer co-operation rather than co-ercion. This is the motto of the state highway commission in all its dealings with the counties and towns—co-operation—not coercion. He urged the cultivation of the co-operative spirit, rather than the strengthening of the coercive spirit of laws and regulations.

Mr. C. D. Snead, state bridge engineer, took up the question of highway bridges and culverts and this was discussed thoroughly by the members.

The election of officers resulted as follows: G. P. Coleman, state highway commissioner, president; Col. Lucius Gregory, vice-president; S. L. Von Germmingen, secretary-treasurer. Executive committee, G. P. Coleman, C. B. Scott, Z. G. Durfey and Col. E. Gibson.

Mr. Scott strongly advocated that the boards of supervisors in the various counties be allowed to enforce rules and regulations subject to the approval of the highway commissioner for transportation over the highways of their jurisdiction. The suggestion was adopted. A chairman in each district will be appointed and to him will be left the regulation of the roadways in his district, their management and building.

The following recommendations were offered and adopted:

That all vehicles, standing or in motion on main highways at night, be required to carry a light.

That no one be allowed to pile any material within the right of way of any road without permission from the local authorities.

That suitable penalties be provided to prevent the stopping of ditches and drains.

There was adopted also a resolution concerning the various widths of tires to be used on country highways.

Mr. George C. Warren, President Warren Brothers Company, on February 12th delivered a lecture on "Public Recognition of and specifications for Patented Pavements" before the Graduate Students in Highway Engineering at Columbia University.

Arthur H. Blanchard, M. Am. Soc. C. E., Consulting Highway Engineer and Professor in charge of the Graduate Course in Highway Engineering at Colum-

The Same Road Two Years Later, After Improvement Under the Direction of the U. S. Office of Public Roads.

bia University, on February 11th delivered an address on the subject "The Highway Engineer in Public Life" at the annual meeting of the Engineers Society Northeastern Pennsylvania.

Convict Labor For Oklahoma

By F. C. HAND

Purcell Consulting Engineer

CONSIDERABLE time and money has been spent since statehood in an effort to improve our rural transportation facilities, but a careful review of results so far can only lead to the conclusion that but very little has really been done in this direction.

It seems hardly worth while to go into the many reasons which go to account for this paucity of results, but the bald fact is that we are far behind the point where we should be after seven years of statehood, and that we must certainly aproach the problem from an entirely new angle if we expect to get anywhere.

Conditions in Oklahoma are not such as enable us to avail ourselves of the means of building and maintaining such a system of roads as many of the older states are doing; bond issues, either state, county or district, are impracticable except in possibly a very few of our counties; a direct tax in an amount which would prove of any material benefit is also impracticable for obvious reasons, and it would appear at first glance that we are virtually helpless to improve our condition to any appreciable extent.

There is, however, a source of energy that can be utilized to excellent advantage on our highways, which lies ready to our hand if we will but avail ourselves of it; and that is the labor of the convicts in our penitentiaries.

It is true that we now have a law on our state books authorizing the use of convicts in this way, but this law is entirely inoperative, at least so far as I am advised, because no way has been provided to put it into practical effect.

We have hundreds of men in our penal institutions who can be used in this way with great and lasting profit to the general public and also with great benefit to themselves from a social and humanitarian point of view, as criminologists all agree. I believe that work of this character has a remarkably beneficial effect upon the moral fiber of convicts so employed as well as upon their physical welfare.

A perfectly feasible plan by which an enormous amount of work can be done on the highways of our state can be worked out something like this:

Let the legislature make an appropriation sufficient to completely fit out, say two gangs, buying the necessary teams, tools and camp equipment; then put them at work, under the supervision of the state highway department, in the different counties and build fifty or perhaps, a hundred miles of good roads every month, the amount, of course, varying with the physical difficulties encountered.

The distribution of these forces among the different counties should, of course, be equitable, but so far as practicable the work should be continuous, or nearly so, to avoid cost of moving from one locality to another.

The counties or districts in which these forces are worked should be required to pay only the additional cost to the state which is incurred over and above the present cost of keeping them in the penitentiaries. This would be so little in proportion to the value received that every county in the state could probably find a way to take care of this feature in plenty of time to receive the benefits.

It has not been attempted, within the limits of this paper, to go very minutely into details but an outline has been given of a general plan which would undoubtedly give us a good many hundreds of miles of good roads every year.

It is possible that it would be better to work one gang exclusively on through lines of road clear across the state, and the other, should there be two, in a more localized manner; or, it may be found better to work all gangs on main thoroughfares for a year or two and then take up the more local roads. This is a matter of detail, but in any event we can get our highways improved at a merely nominal cost.

In perfecting legislation of this character some provision should be made for keeping up these roads when built, and the counties or districts should be required to guarantee this maintenance as one of the conditions under which work would be done in each locality.

Our neighboring state of Texas has, during the last year, been working a considerable number of her convicts in different counties under the so-called "honor" plan, under which the convicts are paroled by the governor and are worked without guards, the county or district paying to the state $15 per month for the labor of each man. One half of this sum goes to the state and the other one half to the man for the use and support of his family.

Governor Colquitt advises me that this plan has proved very successful and that very few of the men have attempted to escape, although quite a number of them are life-termers.

It is quite possible that a plan of this kind, with some modifications, might be used to advantage here, but this again is a matter of detail.

In the above sketch I have, I think, made it plain that in our convict labor we have a great potential opportunity and it only remains for us to make use of it. Let's get busy.

Walter Gilbert, secretary to the state highway commission of Oklahoma, is preparing a series of maps showing routes in different directions from Oklahoma City to various parts of the state. Each route in each direction is clearly outlined, and the map will show the tourist just how to go and where he is going. One route reaches the Kansas line one to the Red river, another through the oil fields and another through the western part of the state, with Oklahoma City as the hub. General information as to touring lines to the north, south, east and west is given. This includes the interstate lines. The maps will be of inestimable value to tourists.

The Pennsylvania Motor Federation is drafting a bill to present to the legislature to raise $7,000,000. A levy on real estate is planned to raise $3,000,000 of the amount.

A highway will be built into the Yosemite Valley. 324 miles of concrete boulevard will be built and 160 miles of granite highway will be constructed.

Road District No. 1 of Prairie county, Ark., will build 13 miles of macadam road at an estimated cost of $60,000.

The Permanent Features of The Roadbed.

An important factor in the financing of good roads by county bonds is discussed by the authors of Bulletin No. 136, of the United States Department of Agriculture, entitled "Highway Bonds."

In this bulletin the authors point out that in expending money raised by the sale of highway bonds the highway commissioners should distinguish carefully between the permanent and the perishable features of the road. Foundation, drainage structures, alignment and grades, are permanent features which should be looked upon in the light of an investment. If these features do not comply with a certain standard, it will be poor economy to spend money on transitory improvements such as hard surfaces, which must be renewed at considerable expense from year to year.

Local conditions, of course, determine to a great extent the proper standards for the permanent features of any highway. Twenty years experience in modern road building has shown, however, that there is a minimum which any road built on borrowed money should comply with. A close study of 244 different types of road shows that to meet this minimum standard, the following sums will probably have to be expended for three standard kinds of highways:

Type	Drainage and grading	Surfacing	Total	Drainage and grading	Surfacing
Gravel (20 ft. wide)	$1,817	$2,599	$4,416	41.15	58.85
Macad. (15 ft. wide)	3,400	5,815	9,215	36.89	63.11
Bit. Mac. (15 ft. w.)	2,765	7,533	10,298	26.85	73.15

A study of these figures will help counties to avoid the common error of first fixing the sum to be spent and then demanding an exorbitant mileage in return for it. So-called macadam roads have been built with bond money by simply spreading broken stone in the mud. The inevitable result of such shortsightedness is that long before the bonds have been paid off, the improvements for which they were issued have ceased to exist and the county has nothing to show for its increased debt. In the same way, it is manifestly poor policy to build an expensive surface on defective grades with poor alignments and shortlived drainage features.

Even when much of the money expended upon a highway has gone into the permanent features, there is still danger that the cost of repairs and maintenance will be overlooked, or at least slighted, in the calculations of the road-builders. When roads are built with borrowed money it is, of course, especially important to avoid this error. On the other hand, however, it is not necessary to regard the total cost of surfacing a road as a temporary improvement. Much of the surfacing may be classed as a permanent investment, for it is becoming more and more common to have surfaces built in two courses, the lower of which is as much a permanent feature of construction as the grading itself. This is particularly true of these types of road that are built with concrete foundations for bituminous-macadam, brick, or asphalt surfaces. It is probably conservative, indeed, to regard 40 per cent of the surfacing cost of macadam or more enduring pavements as a permanent investment. It is seldom nowadays that hard roads are permitted to wear into the foundation course of the surfacing.

Probably it is safe to say that an average of about 62 per cent of the total cost of a well-built macadam road should be put into the permanent features, and with bituminous-macadam roads, about 56 per cent. This method of estimating cannot be applied to any gravel or natural soil road in which no part of the surfacing can advantageously be considered permanent, for under most systems of maintenance it steadily deteriorates.

Roads built with surfaces entirely of concrete, or with brick pavements resting on a concrete foundation, are generally regarded as permanent, but it is not yet

Top Soil Road in New Hanover County, N. C.

definitely known how long the best concrete surface will last. The best vitrified brick surfaces may last a number of years, but even with them repairs will be required.

To sum up, the authors of this bulletin point out that the initial cost of a road is never the final one; that no surface is permanent, and that repairs and maintenance charges will always be necessary. On the other hand, many features of a good road are to be regarded as permanent investments. When roads are built with borrowed money, the distinction between the permanent and the temporary improvement must be carefully observed, in order that the county may have something in exchange when the time comes to repay the loan.

The Austin-Western Memorandum Book.

The Austin-Western Road Machinery Co., of Chicago, are sending out a very attractive memorandum book. They call it a catalogue-memorandum book, and that is what it is. The company issues ten big catalogues, showing their extensive lines and this little book contains the information the road man wants know about every one of these catalogues. One side of each page is reserved for memoranda and the other is devoted to the great Austin-Western line. The cover design is unusually attractive. It is lithographed on celluloid in 12 colors and makes the book a real work of art.

If you want one of these beautiful and useful books, drop the Austin-Western Road Machinery Co., Chicago, a postal card, asking for it and stating that you saw a reference to it in Southern Good Roads.

Cave Spring district of Roanoke county, Virginia, votes next month on a bond issue of $90,000 to construct a system of roads 22½ miles long.

Lake county, Ore., has just completed a $10,000 section of the Pacific highway.

GOOD ROADS NOTES
GATHERED HERE and THERE

Alabama.

Writing in answer to an inquiry from this publication as to prospects for road work in 1915, Mr. R. P. Boyd, assistant state highway engineer, of Alabama, says:

"The general outlook for road work in this state is better than ever before. Owing to a recent decision of the supreme court allowing counties to issue interest bearing warrants in payment for roads and bridges. There will be a number of counties to avail themselves of this decision and already there has been expended nearly one-half million dollars by the warrant method. There is expended in Alabama from the general funds of the counties approximately $1,500,000.00 each year. This is generally increased a little each year and I should say there will be a minimum of $1,750,000.00 from the general funds of the counties upon the roads of the state. This will probably be expended on something like 1000 miles of road. There is available from the state $220,067.31. To meet this the counties are required to put up an equal amount, so that in round figures that will be approximately one-half million dollars available for expenditure under the direction of the State Highway Department.

"There has been introduced in the legislature, which is now in session, a bill to transfer the funds received from the automobile tax to the State Highway Department. If this is done, it will net about $100,000.00 the first year for road expenditures. This will be in addition to the other appropriation of $2000.00 to each county each year, unless it is repealed."

* * *

Arkansas.

It is reported from Russelville, Ark., that great interest and enthusiasm is being aroused in the project to build a fine road through the Ozarks. Mass meetings were held at Russelville, Scottsville, Dover and other points last month to consider the macadam road from Russelville north to Harrison and it was decided to draft bills for presentation to the legislature for forming road improvement districts in Boone and Polk counties to finance the proposition.

The proposed road will be about 96 miles long, about one-half of the distance being through the forest reserve in northern Pope, Newton and Boone counties. Forest officers say the government will construct the road through the reserve if the property owners will extend the road north to Harrison and south to Russelville, giving railroad connection at each end. If the improvement district is formed in Pope county the road will be extended through Russelville south to Dardanelle, a distance of five miles.

This is one of the largest highway projects ever undertaken in the state, and if completed will open up a vast section in the Ozark mountains that is rich in timber and mineral resources and also exceptionally adapted to fruits and grazing.

The thirteenth annual convention of the Arkansas Good Roads and Drainage Association, held at Little Rock last month elected officers as follows: President, Ed. P. Molitor, Helena; vice-president, J. S. Abercrombie, Benton; secretary and treasurer, Geo. R. Brown, Little Rock. The president and vice-president are the county judges of Phillips and Saline counties, respectively.

The legislative committee is composed of the following county judges: W. A. Coker, Monticello; C. M. Philpot, Pine Bluff; J. S. Abercrombie, Benton; W. B. McLean, Newport; Harry E. Cook, Lake Village; J. J. Montgomery, Clarksville.

* * *

California.

Mr. George B. Harrison, editor of the Highway Bulletin, the official publication of the California Highway Commission, writes Southern Good Roads an interesting letter concernig road work in his state in which he gives the following facts:

The California Highway Commission has let contracts, including certain work done on a day labor basis, for 987 miles of highway improvement, of which 670 miles is for a cement concrete base, mainly four inches in thickness and fifteen feet wide, although the width where the traffic is heavy is extended to 18, 20 or 24 feet. Including this mileage, surveys have been made for 2150 miles of the state highways system, which in all will include about 3,000 miles of improved road. An approximate cost as made up from the first 211 miles of road completed and accepted may be detailed as follows:

Excavation, regardless of classification	$0.44 per cu. yd.
Concrete, in structures	12.60 per cu yd.
Concrete in pavement bases	5.93 per cu. yd.
Asphaltic concrete wearing surface, in.	
1½ in. thick	0.54 per sq. yd.
Thin bituminous tops (3-8 to ½ inch thick)	0.09 per sq. yd.

* * *

District of Columbia.

Writing to Southern Good Roads concerning the outlook for road work in the District of Columbia for 1915 Mr. C. W. Kirk, district engineer commissioner, says:

I have to submit the following data with respect to road construction and maintenance in the District of Columbia for the fiscal year ending June 30, 1914. Appropriations for such work were as follows:

For construction of suburban roads	$194,250
For repairs to suburban roads	140,000

The amount of work done has not been converted into miles. It was divided between asphalt pavements, bituminous concrete and cement concrete pavements and macadam roads.

During the fiscal year ending June 30, 1915, the appropriations are as follows:

For construction of suburban roads	$142,500
For repairs to suburban roads	145,000

This work is still in progress.

The appropriations for the fiscal year ending June 30, 1916, have not yet been made, but the probability is that they will be much smaller than those of the present fiscal year.

* * *

Missouri.

Hon. Frank W. Buffum, state highway commissioner of Missouri, in a letter to Southern Good Roads, states

that while there was not as much noise about it in 1914 there was more road work done than in 1913. He says:

For instance, taking into consideration the fact that this state suffered through the central and south-eastern portion of it very heavily by reason of the drouth, and that the other portion of it suffered to a considerable extent, and then followed up later by the fact that the panic came on, which tied up all the funds, and later a desire on the part of bankers, and for good reasons, not to encourage the spending of large sums of money for road machinery, that it means that we were handicapped to a great extent, but even then the road work has gone on, and a great deal of road work is planned for the future.

In a large number of places in the state by reason of the fact that our department has continually urged the buying of large tractors and heavy road machinery of a modern kind for the building of roads, has been the means of putting in a large number of counties this class of machinery. It has demonstrated to the people that the plan we have suggested is along the proper lines, and no sooner do we get an outfit located in a county than an adjoining county board, visiting at our request this demonstration, at once make arrangements for their home counties to buy a similar outfit; and the counties, of course, having over one hundred miles of road each, naturally it would be a long time before they would get their roads worked, and so they are calling now for extra tractors in these counties, and the effect is that in some counties we have three or four tractors, and the writer believes that the time is going to come when the tractors will approximately amount to one for every township, and when that time does arrive the people will find it necessary to put in good and substantial culverts before the tractors are used, and also heavy bridges, so that it will have a double effect, not only be the means of building up the roads, but building up the bridges.

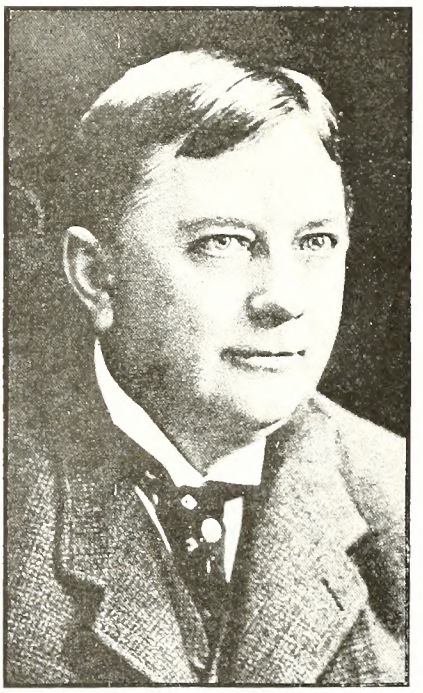
Immediately following the grading of the roads, and getting them in good condition, the next question is what can we do, and we then urge upon them the covering of the roads with crushed rock or gravel, and so we are working now a little further along, and that is the putting in of trail wagons behind the tractors, or the putting in of motor trucks that will go over the road at a speed of 10 to 12 miles an hour, and returning at a like speed, and which will haul approximately three yards of stone or gravel, and which means that roads which have been considered impossible to build, by reason of the long hauls by teams, will soon be built by this system.

If we should have good crops in the state this year, and the banking conditions will continue to improve as it is at present, and the county courts feel that they are warranted by these facts in asssessing a little heavier tax where possible, and the buying of heavy machinery, then with that in view, we hope in 1915 to build at least anywhere from two to three times as much mileage of roads as we did in 1914, and as each culvert is built of concrete, each bridge made with a concrete top, then that matter is out of the way forever, if the construction is properly done.

Then comes the question of hill cutting, and the farmers are all greatly helped by the heavy machinery to take down these hills. Hills are not a necessity. They are a heavy expense in our state, and once removed they are out of the way forever. We are beginning to commence to get the people to think along the same lines, and we want them in cutting a hill not to bring it from a 15, 18 or 20 per cent down to a 8 or 10 per cent, but to get them cut down as low as possible.

We have also had a campaign on hedge pulling. The writer thinks that hedges cost our state more than hog cholera, Hessian fly, and everything else in the insect line, because they are there every year to cause damage, and while the insect possibly will come only once in ten years. We are also asking that hedges be cut to 5 feet, if they are maintained at all, that they do not shut off our roads and keep the sun and air from drying them out, and forming snow drifts in the winter time.

We are asking that all roads be made forty feet wide, so they can be properly graded, and that the road overseers will look after the man who is moving in his fence and taking from the state that property to which he is not entitled. A great many accidents are being caused by hedges obscuring corners, and corners be-



HON. F. W. BUFFUM
State Highway Commissioner of Missouri

ing obscured by being located in cuts. We are asking that all corners be rounded, and not a small corner be taken off, but cut in thirty or forty feet, so we can get big round corners and save accidents, and head-on collisions.

The question of eliminating railroad crossings is one that our department has pushed very vigorously for the past two years, and we are getting the railroads to work with us, and now that the money market is better so that they can spare funds for putting in these improvements, we anticipate that they will be still more anxious to eliminate these dangerous spots in our highways.

We tried to get an amendment to our Constitution, allowing us the benefit of a tax of 10c. on the $100.00 for road purposes, but as there were about sixteen other amendments along with it, they all went down together, as it was generally conceded they would. We hope this year to have a law passed where this amendment will be passed.

We do not have a large amount of revenue in our department, and we are greatly handicapped for that

reason. Our appropriation was exhausted sometime ago, but our department is kept running just the same. Now we hope this session to show where money is needed in our department, and we believe that the members of the legislature will be more than anxious to grant our reasonable requests, as great eare has been taken in the spending of the money to see that the people of the state got their money back in every instance.

* * *

South Carolina.

In Chesterfield county, there is being waged an intelligent, enthusiastic eampaign for a system of good roads for the entire county. The plan is to have every township in the county issue bonds and build a system for the whole county, under the supervision of a competent engineer.

In this issue appears a photograph of the group of men who are leading the fight in their respeetive townships. The cut was sent to Southern Good Roads by Mr. LaCoste Evans, of Cheraw, who is famous throughout his section as the "Good Roads Pusher." The eleetion comes off on the second Tuesday in May.

Mr. Evans is carrying his good roads campaign into the homes of the people. He has addressed reeently to the women of Chesterfield eounty, the following appeal:

"The Road That Runs By Home" is the road in whieh you are vitally interested, because it is the one that makes it hard or easy for you to go to town, or to ehureh, or to see the neighbors, or for the ehildren to get to school. The distance from all these plaees depends not alone upon the number of miles that lie between you and them, but to an almost equal extent upon the kind of road you have to travel over to get to them. Five miles on a "Good Road" may often be traveled more quickly and more easily than two miles on a poor road; and if you feel lonely and out of the way, there is nothing that will do so mueh toward helping this eondition as "Good Roads"—they make the miles short, as the Chinese say. Every farmer's wife should be a "Good Road Booster," and should at all times, and in every possible way use her influenee and her voice to the improvement of the highways and roads of her township, county and state. The farmer's wife, above all others, wishes the eountry to be a pleasant plaee in whieh to live, and in many eases, few things would do more to bring her in toueh with her neighbors, and the outside world than would be the building and maintaining "for all time" of "The Road That Runs by Home." "Good Roads" allow "Mother's Children" to go to sehool every day of the school term with Dry Feet and warm elothing. Let's get out of the Sand—Ruts and Mud Forever and Chesterfield County will truly be "The Garden Spot county of South Carolina."

Tell your old man and the boys to vote yes—for Your township bond issue.

* * *

Tennessee.

The following statement concerning road conditions in Tennessee is from Mr. Cyrus Kehr, a well known lawyer of Knoxville and one of the leading good roads enthusiasts of his state:

Tennessee has no state highway department. All the road work is done by individual counties; and there is no uniformity respeeting county work, for all the counties are operating under speeial aets. No provision is made by the state or otherwise for assembling information regarding the eonstruction or improvement of roads or amounts expended. A few individual counties have during the last year expended eonsiderable amounts of money raised through the sale of

county bonds. In some cases this work is well done and the money wisely expended; but much of the expenditure and construction throughout the state have been unwise. Sometimes I am inclined to believe that the counties which make no effort at all toward road improvement are the most fortunate; for they will have bad roads without bond debt, while other counties soon again have bad roads plus a bond debt. It looks as though there were room to believe that county bond issues and attempts at road improvement should be delayed until it is learned how to build roads that will last and how to use the money dollar for dollar in building such roads.

Tennessee can never do well with highway work until it has a strong and well organized state highway department authorized to build state highways and to assist the counties and direct the counties in the building and maintaining of county highways. The general assembly will convene early in January, and an effort is to be made by a large number of men from different parts of the state to procure the passage of bills for suitable highway laws, the chief of which is to provide for a state highway department.

When this state once has a proper road-working organization, we shall have fine highways. We have ample material in nearly all parts of the state, and we have a large amount of fine scenery which such roads will make accessible to the Tennessee people and the people of the outside world. Indeed, it may be that this will be a case of the last being the first; that, after having waited so long, Tennessee may have the finest roads associated with the best scenery.

Annual Meeting of the American Road Builders' Association.

George W. Tillson, consulting engineer to the president of the Borough of Brooklyn, New York, N. Y., was elected president of the American Road Builders' Association, which held its regular annual meeting at the Hotel Astor, New York City, on Friday, February 5.

Other executive officers for 1915 were elected as follows: First Vice President, A. W. Dean, Chief Engineer of the Massachusetts Highway Commission; Second Vice President, Austin B. Fletcher, State Highway Engineer of California; Third Vice President, S. Percy Hooker, state superintendent of highways of New Hampshire; Secretary, E. L. Powers; treasurer, Major W. W. Crosby, consulting engineer, Baltimore, Md.

In addition, the following were elected directors for three years: E. A. Fisher, city engineer of Rochester, N. Y.; A. R. Hirst, state highway engineer of Wisconsin; Joseph W. Hunter, first deputy commissioner, Pennsylvania State Highway Department; Frank F. Rogers, State Highway Commissioner of Michigan; William R. Smith, general manager of the Lane Construction Corporation, Meriden, Conn., and H. M. Waite, city manager of Dayton, Ohio.

Besides the election of officers, business taken up at the meeting included the reception of the annual reports of the secretary, the treasurer and the executive committee. The report of the executive committee showed a very substantial gain in membership during the year and a very satisfactory financial condition. The report also touched upon the eleventh annual convention of the association held at Chicago, Ill., December 14-18, 1914. It was reported that the registration at this convention showed a larger attendance than at any previous meeting of the organization, and it was stated that, in fact, the attendance was believed to have been the largest gathering of those interested in road building ever held. It was also stated that the

exhibition of machinery and materials held in conjunction with the convention occupied more space than any other exhibition of the kind.

At the Chicago convention progress reports were made by the association's committee on standards and on legislation, and it was voted that the reports of these two committees be taken up and acted upon at the annual meeting in February. In accordance with this vote, these reports were presented at the meeting on February 5, and it was voted that they be accepted and printed in the annual "proceedings," for discussion and further action. Both reports were thorough and will be received with great interest in road building circles.

At the close of the business session at the Hotel Astor, the gathering adjourned for dinner at Rector's at half past six. After dinner the report of the tellers was received, and brief addresses were made by W. A. McLean, the retiring president, who acted as toastmaster; President Tillson; Past President James H. MacDonald, formerly State Highway Commissioner of Connecticut; H. M. Swetland, president of the Class Journal Co., New York, N. Y.; William H. Connell, chief of the bureau of highways and street cleaning of Philadelphia, Pa.; R. A. Meeker, state highway engineer of New Jersey, and Frank D. Lyon, secretary of the Inter-state Stone Manufacturers Association, Columbus, Ohio.

GOOD ROADS NOTES IN BRIEF

Duval county, Fla., is contemplating a bond issue to build two expensive bridges.

Hillsborough county, Fla., will build a number of steel bridges.

A bridge is to be built over one of the principal streets in St. Louis by the Missouri Pacific Railway Co., to cost $315,000.

Houston, Tex., will build a bridge at Milam street to cost $37,000.

Bedford county, Va., will construct a steel bridge across Elk Creek, three miles from Forest.

Mobile county, Ala., will repair the Dog River bridge at an estimated expense of $8,600. A concrete foundation is to be built.

Calcasieu parish, La., contemplates the construction of a concrete bridge of the bascule type.

Jones county, Miss., has contracted for two steel bridges.

Johnson county, Mo., has contracted for 30 steel bridges.

A movement is under way at New Berne, N. C., to bridge Mill Swamp creek.

Henrico county, Va., will bridge the Chickahominy river at a cost of $23,000, the bridge to connect Henrico and Hanover counties.

Carter county, Ky., has voted bonds for $150,000 for roads.

Norfolk county, Va., has legislative sanction for the issuance of $200,000 of road bonds.

Lewis county, Ky., has voted $150,000 of road bonds.

Baltimore, Md., has let paving contracts recently amounting to $335,000.

It is announced from Greeneville, Tex., that Road District No. 1 of Hunt county has contracted for 40 miles of concrete road at a cost of $400,000.

Union district of Marshall county, W. Va., will spend $50,000 on the Fairmont Pike. The construction will be of brick or tar-bound macadam.

St. Charles Parish, La., has let contracts for 20 miles of gravel roads at a cost of $110,000.

Jackson, Miss., will lay 8,000 square yards of paving at a cost of $6,000.

Louisville, Ky., has contracted for street improvement to cost $89,000.

Manatee, Fla., will spend $40,000 in paving streets.

Mt. Pleasant, Tex., will pave several important streets at a cost of about $30,000.

Bexar county, Tex., has let contracts for 56 miles of road.

Tulsa, Okla., has contracted for one mile of boulevard.

Orangeburg, S. C., is asking for bids on about 5,500 square yards of vitrified brick paving.

New Hanover county, N. C., will build 7½ miles of clay-gravel road.

Blount county, Tenn., has voted $300,000 of bonds for highway improvement.

Union county, S. C., will vote April 6 on a $200,000 bond issue for roads.

Taylor district, Scott county, Va., votes this month on a $68,000 bond issue for roads.

Victoria, Tex., votes this month on a bond issue of $30,000 for street improvement.

Big Creek Magisterial District, McDowell county, W. Va., votes March 20 on a bond issue of $165,000 for roads.

On March 23 Palm Beach county, Fla., will vote on a bond issue of $800,000 for road building.

Yadkin county, N. C., will vote March 25 on a $200,000 bond issue for road building.

McKinney, Tex., has contracted for 25,000 square yards of paving.

Palo Pinto county, Tex., has contracted for 36 miles of road at a cost of $96,000.

Ingram township, Johnston county, N. C., has let contracts for road work amounting to $40,000.

The city of Baton Rouge, La., will pave 16 miles of streets at an estimated cost of $350,000.

Contract for 30 miles of roads in Tarrant county, Tex., were let last month for $96,600.

Dade county, Fla., will vote March 16 on a bond issue of $100,000 for road improvement.

De Soto county, Fla., will build six re-inforced concrete bridges and many culverts in connection with road improvements to be made. All wooden culverts will be replaced with metal culverts.

Galveston, Tex., has contracted recently for the paving of ten blocks.

Marshall, Tex., will do additional street paving amounting to about $18,000.

Mobile, Ala., will resurface with asphalt Capitol street.

The town of Cushing, Okla., will pave 11 blocks. Contracts not yet let.

Clarksdale, Miss., will build three miles of gravel streets. The town has about $20,000 available.

Coahoma county, Miss., will build about four miles of gravel road. The county has $60,000 available for road work.

Frederick county, Md., will build a 2½ mile stretch of state road at an estimated cost of $35,000.

St. Mary Parish, La., will build 60 miles of roads.

Putnam county, Fla., is planning to construct 12 miles of brick or concrete highway.

Sapulpa, Okla., will pave six blocks.

Parkersburg, one of West Virginia's most progressive cities, has voted $200,000 of bonds for street paving.

The city of Corpus Christi, Tex., has voted $100,000 of bonds for street improvement.

De Witt county, Tex., will build 14 miles of roads with the proceeds of a $50,000 bond issue.

Road District No. 2 of Grimes county, Tex., will vote this month on a bond issue of $65,000 for roads.

Sarasota-Venice district of Manatee county, Fla., will vote soon on a bond issue of $250,000 for roads.

Road District No. 1 of Brazos county, Tex., will vote this month on a bond issue of $400,000 for roads and District No. 2 will vote on a $65,000 bond issue for the same purpose.

Cleburne, Tex., will vote this month on a bond issue of $100,000 for good streets.

On the 13th of February, Bell county, Ky., voted to issue bonds of the county to the amount of $250,000, to be sold and the proceeds devoted to the building of pike roads, bridges and some other road improvements in the county. It is anticipated that the funds from the sale of these bonds will be ready for use by the early spring, and that, under the law, the contracts for the construction of these roads, and other improvements, will be let, or at least open for letting, within the next ninety days.

some time clamor for locations in the highway, and although too little attention has thus far been paid to the matter, tree planting and other landscape treatment of our country highways will have to be provided for.

In many of the older sections of the country right of way problems are not serious affairs. Ways have been established there, well defined and traveled, for many years, and right of way improvements consist chiefly in rectifying the side lines of locations where abutting land owners have encroached successfully under the "open adverse possession" statutes which apply in some of the states.

But in many localities, the acquisition of necessary easements of way becomes as important a factor in the plan and progress of highway work as the road work itself.

In the more sparsely settled communities, roads have been built following lines of least resistance, in the valleys the "sectionalized" land lines, and in the hills wherever the ranchers could best spare it. Accordingly, when modern road building methods are invoked, it becomes necessary to alter meandering and precipitous roads by straightening, widening, and improving the gradients. The needed rights of way for these purposes must be acquired.

This feature of the work is particularly annoying to the highway engineer. His desire is to press forward the best line in the best way in the best time. When he is confronted by a hostile, reluctant or indifferent land owner, the engineer usually loses his patience.

It is not alone in cases of new rights of way that there is litigation, but frequently old surveys do not exactly coincide with existing ways, many of which in course of usage have become winding and irregular, and consequently additional land has to be acquired to widen, straighten or alter them.

Owners often build fences or cultivate up to the used portion of the ways and resist the shifting of the lines and delay the progress of the work. In many cases much time is lost where owners who have allowed people to pass and re-pass in vehicles without objection for years, assert adverse claims and work must be delayed to avoid complications.

One has also the experience of attempting to use dedicated rights of way shown on plats recorded in times past but which have been entirely unused or allowed to fall into disuse, and then being confronted by claimants, with their attorneys, who contest the rights of the public therein.

There are many unavoidable delays in obtaining rights of way, arising outside of the disputed rights of way mentioned. Even when the owners intend to be liberal they exact a great deal of information before signing the deeds of easement. The records have to be searched to ascertain the true owners of the lands affected; owners must be notified or corresponded with; draftsmen are asked to furnish sketches to many owners defining the rights of way desired; visits to the lands must be made and surveys inspected; minor adjustments of lines and fences must be settled upon; vacation proceedings arranged and prepared, abandoning the old roads or portions of roads over property so as to leave no incumbrance on the same when the new road is located and built; co-owners must consult among themselves before executing deeds of easement, ownerships involved in probate proceedings or title litigation must be searched and a good title to the roads acquired out of the confusion, and there are other details ad infinitum.

A Gravel Road at Richmond, Indiana, Which Has Stood Heavy Traffic Exceedingly Well

These many difficulties have led, in the writer's western experience in highway work, to the employment of the subtle right-of-way man, who needs be a psychologist as well as a philosopher. His chief duty consists in attempting to wheedle the often-times contrary land owners into signing the needed conveyances and to convince them, usually, that their duty to the public lies in giving their property gratis. Such an employee becomes a very important member of the organization. His troubles are many.

In addition to the "right-of-way man" and his assistants in the California work, the help and advice of an attorney learned in eminent domain practice has been had who devotes all of his time to the highway work and whose principal activities are in right of way matters. The writer takes this opportunity of acknowledging the assistance of Mr. Charles C. Carleton, attorney to the California highway commission, in the preparation of this paper.

In many jurisdictions, if the deeds cannot be acquired by diplomatic methods, war must be declared in the courts, and the highway board must desist from its efforts to promptly furnish the community with necessary thoroughfares until the courts finally determine that the litigous land owners' holdings may be entered upon.

There is a great lack of uniformity in the different states in the methods of paying or securing the payment of damages in taking property for public highway purposes. Such methods are of course regulated entirely by the constitutions and statutes of the respective commonwealths.

In some states it is not necessary for the authorities to pay for private property taken for public use in advance of the actual taking of possession. The property owner has been provided with a method of making his claim and with a tribunal constituted so that he may enforce his claim and obtain his damages therein.

In such jurisdictions, highway work may speedily progress and the laying out of routes followed by immediate construction. The property owner, if he is dissatisfied with the original offer of payment or the award made to him by the public authorities, may pursue his remedy in the appropriate court even though his land has already been occupied by the public.

The public has the advantage of celerity in the progress of its enterprise; the land owner is protected by ultimate and adequate compensation for his injuries, and in one state, at least, he may wait until after the state highway is completed before he must file his petition for jury trial, it then being evident to all interested parties just what damage has been done, not only by reason of the land taken but by the road construction as well.

But some states are so unfortunate as to be harassed in their public work by constitutions and statutes expressly requiring prepayment before entry upon the land required for public use.

The writer has had to do with highway activities in two states which have operated under each of these methods, the one having the right to take land necessary for public use in advance of satisfying the owner; the other requiring that if the owner is not pleased with the offer made to him by the public authorities, he may stand back on his property with a shot gun and compel public officers to initiate proceedings in the court and remain off his property until after judgment has been obtained and the assessed damages paid into court for his use and benefit.

In the first mentioned commonwealth, the welfare and progress of the people as a whole are superior to the notions and eccentricities of an individual land owner.

In the other state, the recalcitrant land owner may oppose and delay the vital needs of a city, county or state, as the case may be, and his immediate rights predominate over the requirements of the community at large.

No rights of way, in states having regulations similar to the latter, can arbitrarily be taken by the people before the same, after a vast amount of red tape, have been acquired by donation, purchase or condemnation; that is, a taking cannot be made and compensation and damages adjusted afterwards.

Consequently obstinate land owners are able to "hold-up" the community at large until it either pays the demands or contests the question of compensation and damages in trials, the latter usually requiring considerable time, particularly in the case of the belligerent or indifferent land owners residing in other states or foreign countries when long publications of summons are necessary before the suits may be commenced. The western states appear to be particularly oppressed by such roundabout methods of entering upon private property and installing improvements for the benefit and welfare of millions of people.

For illustration, under such a system a large western land owner owning an area equal in size to an entire eastern state may be luxuriously traveling abroad. A county has voted and issued bonds for a large amount to construct important highways. Before the great ranch can be entered upon, except for surveys, a correspondence must ensue between the public authorities and the land magnate. The owner declines to sign a conveyance and the people are compelled to commence proceedings in eminent domain against the absent owner. Before a trial can be had, summons must be published for sixty days, and then follow the tedious court proceedings.

It usually happens that pugnacious land owners demand some exorbitant sum. The court may upon trial only allow a small percentage of their original claim but during the pendency of the action an important artery of travel may be debarred.

Such a system is absolutely hostile to progress; the people should be greater than the individual.

The writer submits that at this time, when modern highway construction is becoming so active throughout the nation, it is aparent that there should be simplification in the constitutions and statutes relating to the subject of eminent domain, and that this congress may render invaluable service in assisting to bring about so desirable a result.

Too much attention can be given to the title technicalities of right of way activities. It has been an almost universal practice for public boards performing road work to obtain at great expense exhaustive abstracts of title to ascertain land ownerships.

The writer has had under his supervision the acquisition of hundreds of miles of highway right of way in California where the securing of rights of way could not be made much more difficult, complex or annoying, yet the purchase of expensive abstracts of title has been dispensed with. Out of hundreds of ownerships affected, not one serious complication has resulted from the following plan:

When the field parties are making the original surveys, the chiefs of party usually inquire from the occupants of the land surveyed who the owners or those interested in the property may be. This gives a clue to the ownership. Thereafter, one of the staff visits the proper county offices and ascertains from the as-

sessment rolls of the records who purport to be the owners. Deeds or agreements are then prepared, containing the proper descriptions, and it is very rare, indeed, that any objection has been made to the accuracy of the instrument submitted.

By thus performing its own title searches, even though they may not have always been the most exact from a title lawyer's standpoint, the authorities have saved thousands of dollars and have never had an injunction or ejectment proceeding instituted against them by objecting land owners.

By taking a few remote chances of complaints, work, which would otherwise be hopelessly harassed and delayed in the performance of a highway project, may proceed.

Furthermore, in most states, title may be obtained two ways by user or implied dedication by the passage of time. It has been the custom in California where the present traveled roads are wide enough for use and properly located, to place the monuments and build the upavement and assert jurisdiction thereover, the theory being that if the owner objects, the authority's title being fundamentally weak, the state can "condemn" as rapidly as the alleged owner can "oust."

The so-called state highways in the several states may be divided into at least two classes with regard to the control by the state of the roads after they are built, namely, those which are maintained by the state and over which the state assumes complete charge from property line to property line with the possible exception of the policing of the way, and those sometimes called state-aid roads where the commonwealth has little or nothing to do with the maintenance of the roads and the burden is placed by law upon some subdivision of the state, usually the county.

The writer has had to do only with the class of state highways first mentioned and he believes that the state ought to have as complete control as possible over its highways, state or otherwise. Such control, however, places a considerable burden upon the authority which administers the law.

More is expected of a state organization, and rightly so, than of a county board. Its work must be done carefully and accurately. The surveys and plans of the state highways must be well made and no small part of the engineering costs is chargeable to the careful work needed in running out and establishing the right of way lines.

In trying to establish old right of way lines in anticipation of highway improvements, much difficulty is often experienced in finding any landmarks to indicate what the right of way really is, and the old surveys and plans often prove to be of little assistance. Often the roads to be taken over and built as state highways were laid out when the land was of little value and the surveys were carelessly made or the descriptions carelessly recorded. With the lapse of time buildings, trees, and other similar features, which formerly marked the location of the road, have entirely disappeared, and the traveled ways have shifted from place to place as the action of the elements or the whims of the travelers have directed. Fences, if they exist, have been so moved about that they in no way indicate the original line of the road.

In all state work with which the writer has had to do it has been the policy to fix the right of way lines on the ground by setting proper monuments into the soil to such a depth that they serve as markers for all time to come.

In planning a new system of highways, careful plans should be made and permanent monuments set. Future generations will surely appreciate such records and the additional cost of this kind of work should not forbid.

A Type of the Bridge Construction Being Used in Virginia. Thls Fine Bridge Connects Hanover and Henrcio Counties. It is Re-Inforced Concrete, 100 Feet Long

Proceedings of the North Carolina Good Roads Institute

By MISS H. M. BERRY

Secretary North Carolina Geological Survey

A RESOLUTION was passed by the first Road Institute held March 17-19, 1914, requesting that the University of the state and the North Carolina Geological and Economic Survey make the Good Roads Institute a permanent affair, so that the road engineers, superintendents, road commissioners, county commissioners and others interested in road building in the state could get together and hear discussions of the various road problems to be met with in road construction in North Carolina and thus try to bring about more improved methods of road location and road building.

In accordance with this request, the State University and the North Carolina Geological and Economic Survey sent out letters to all road officials in the state to the effect that the road institute would be held February 23-27, 1915. In sending out this notice, it was stated that the subjects of "Sand-clay and Topsoil Roads," "Maintenance of Highways," and "Culverts" would be given especial consideration; whereas other problems relating to road building, such as road locations, worn-out macadam roads, bituminous compounds, contracts and specifications, blasting materials, etc., would be given space on the program for discussion.

This second institute opened with a good attendance, and eighty men registered, representing twenty-nine counties.

The institute was opened by Dr. Edward K. Graham, president of the university, who welcomed its members in part as follows:

"There are a number of reasons that instantly spring to my mind as to why the University of North Carolina should welcome the roads institute as a permanent part of its activities. One of these is that you are good roads men and I think that if we carry out our purpose at all, we are not only in favor of good public roads, but of good public anything. It is almost inconceivable that there should be a public enterprise of so large an interest as public roads but even with my small knowledge of public roads, considering the amount of capital invested in them, it is of the utmost importance that they be launched in the most intelligent way. There is no public utility that compares with good roads in the amount of knowledge and in the amount of patriotism and of practical business administration required. The greatest invention of our own time, from the public point of view is the discovery of the good public road as an instrument in good government. In that connection I would say that the wireless telegraph, canals and aeroplanes and all the rest of them are extremely interesting, romantic and thrilling but the main thing in which we are interested is the old dirt road. It has been improved very slowly, but we are tremendously interested in making it the best possible now. But I expect you all realize that the road which leads in front of my own door is for me the road that leads to the end of the world, and the remarkably interesting thing is that it is the only road that for me leads to the end of the world."

Joseph Hyde Pratt, director of the institute, then set out briefly the purposes of the institute as being "a clearing house for road problems in North Carolina, to take up every single phase of road work and to work out and solve the problems which we are now facing in connection with road construction. We come here as a group of men who are particularly interested in construction work. I am very glad to be able to say, also, that we have with us those who are not as interested as we are from the engineering standpoint, but who are interested from the contractor's standpoint and from the standpoint of the manufacturers of road supplies. We are going to obtain the best results of road work when there is a just and fair working basis between those who have charge of the road construction work in North Carolina and those who are supplying the materials with which that work shall be done. I hope through the institute that we can all become better acquainted with each other."

The first paper read related to the "Location of Roads," by Professor T. F. Hickerson, of the Department of Civil Engineering of the University. In the discussion following the reading of this paper Director Pratt emphasized the point that "the location of a road is the only part of it that can in any way be spoken of as permanent, so that an engineer should be extremely careful to make a location which will not have to be changed in the future." Mr. Pratt sounded a note of warning to engineers to bear this in mind when political pressure is brought to bear upon them which would have a tendency to warp their technical judgment in regard to the proper location of a road. Personal consideration should not enter into road locations.

Following this, Mr. W. S. Fallis, highway engineer, gave some most interesting data in regard to "Economical Methods of Moving Rock in Road Construction." Mr. Fallis has had wide experience and brought out many points which will be of great practical value to young engineers who have this problem to face.

Mr. D. Tucker Brown, director of the North Carolina Good Roads Association, read a paper on "The Effect of Grades Upon the Location and Design of Roads."

The subject under discussion on the second day of the Institute was "Sand-clay, Topsoil and Gravel Roads." Mr. C. M. Strahan, Professor of Civil Engineering and director of the good roads department of the university of Georgia, gave a splendid description of this subject, which is of such vital importance to North Carolina at the present time. Director Pratt introduced him as "a man who is probably as familiar with this type of road as any man in the country." Professor Strahan took up in detail certain laboratory experiments which he had conducted to show the differences in various types of sand and clay and the qualties possessed by these various types, which would render them desirable in road building. He also emphasized the necessity for the engineer to become conversant with the various qualities of sand and clay and to select his materials in according with this knowledge rather than in a haphazard way. The paper was essentially technical and will no doubt be of inestimable

value to the engineers who were so fortunate as to hear it.

Following Professor Strahan's paper many questions were asked by the engineers present in regard to methods of mixing sand and clay, proper width for a sand-clay road, width and depth of side ditches, maintenance of side ditches; the importance of taking the proper amount of time in the building of a sand-clay road and in the selection of surfacing material; and the importance of a thorough mixture of the materials.

Mr. W. L. Spon, of the United States Office of Public Roads, continued the discussion of sand-clay roads, and gave some interesting data from his wide exper-

MISS H. M. BERRY

ience in connection with the building of this type of road. Mr. Spoon emphasized the necessity for putting new materials on sand-clay roads at the right time of the year and suggested that the fall of the year is the wrong time for adding such materials. He, also, emphasized the necessity for repairing a sand-clay road out of materials of a like quality with which the road is first constructed, and the great importance of not throwing the ditch materials on the road bed.

There was considerable discussion in regard to the disposal of the material from ditches, especially in the mountain sections where there is heavy side hill work; also in regard to the slides encountered by engineers in connection with mountain side work.

Following this, discussions of sand-clay and topsoil roads in Franklin and Vance counties were given by Mr. W. S. Fallis; Craven and Wayne counties, by Mr. R. E. Snowden, and in Orange county by Mr. R. T. Brown. In all of these discussions it was found that certain roads in these counties stood up remarkably well during the bad weather of this winter, while there were certain other roads which went to pieces. From the discussion of this point, it seems that one of the reasons for these roads going to pieces has been the neglect of them after they were first built. In connection with this, Director Pratt said, "We have too much of an idea that a sand-clay road is a cheap road as far as cost goes and that you can build a sand-clay road anywhere from $250 to $500 per mile. It is absolutely impossible to make any statement whatever to a county or community regarding what a sand-clay road will cost them, without making a complete road survey of such a county or community, because the factors which enter into the cost of such a road are not only the location and the grading, but the location of suitable materials with which to surface the road after you have graded it. If you have to move your surfacing material a mile in one instance as compaerd with one-half mile in another section, it will make the cost of the road in the first instance greater. To my mind, one of the functions that you men here representing the road builders must display in road work is to insist on thoroughness, not only in location but in every phase of your road work. We have got to go further and show the people that in the end the best results not only to the road but to the people themselves will be obtained by not hurrying the work but by doing it thoroughly and carefully so that every mile of so-called improved road is made in the very best way it can possibly be done."

Other points discussed in connection with the building and construction of sand-clay roads were maintenance of these roads. Mr. W. L. Spoon gave results of his experience in connection with the maintenance of the Capital Highway from Fayetteville to Cheraw, South Carolina. This subject was also discussed by Mr. D. H. Winslow, of the United States Office of Public Roads, who gave an illustrated lecture treating mainly of his work in connection with the maintenance of a section of the Capital Highway.

The engineers and others invited to the institute were requested to send in samples of sand-clay roads taken from surfaces which had stood up well during this winter and samples from sections of roads which had gone to pieces, which could be tested and determinations made to show why certain materials stood the test of a bad winter and certain other materials did not. These tests were conducted by Professor Hickerson, of the civil engineering department of the university, and Professor J. E. Smith, of the geological department. They were most interesting and the results emphasized the points brought out by Professor Strahan that to build a first-class sand-clay road, you must use good, sharp sand, possessing certain qualities and the right proportions of clay which will not only serve to fill the voids between the grains of sand but with enough stickiness or colloidal quality to help to hold the mass together.

In the afternoon Mr. Frank M. Whitefield, a representative of the Barber Asphalt Paving Company, gave a talk on "The Use of Bituminous Compounds in Road Construction," illustrating his remarks with moving pictures.

Mr. Brent S. Drane, consulting engineer, of Charlotte, gave a paper on "Contracts and Specifications: A Discussion of Their Importance in Road Building."

Following this was a general discussion of the worn-out water-bound macadam and what shall be done with it.

The topic for discussion on Thursday was "Maintentenance of Roads." In opening the session, Director

Pratt said: "There is no question whatever but that in North Carolina today we can obtain without very much trouble the money with which to construct roads. It is not very hard to conduct a campaign of education in a county to vote bonds for good roads, provided you can assure the people that in the bill providing for the bond issue you have certain restrictions in connection with the expenditure of the bond money which will insure that this money will be spent under the supervision of competent men. The hardest problem now is to have included in these road bills a denifite clause in regard to the maintenance of the road after it is built. One of the factors which has worked against good road work in North Carolina has been the fact that so many counties have built roads and then let them go to pieces. You have got to plan the maintenance of a road as soon as the road is completed."

The engineers from the varions counties were then called upon to discuss this question from the standpoint of their experience in the counties in which they are located.

Mr. Fallis made such a report for Franklin and Vance counties, and said: "There is one thing we all onght to stress and that is to build a road which can be economically maintained, so that the cost of this road will in the end be as low as possible. Poor drainage is the greatest enemy of the road and there are several phases of drainage which vitally affect the maintenance of roads. One of the great troubles is lack of information among those building roads as to the effect of the width of the road on its maintenance. A road which is built too narrow is a great deal harder and more expensive to maintain then one built of sufficient width to give a proper drainage. I contend you can build a road thirty feet wide through average level country where fills do not exceed eighteen inches and cuts do not exceed eighteen inches for as small a cost of constrnction as you can build a fourteen or twenty foot road, for the reason that the handling of the outfits is more difficult in making the turns in a narrow road than in a wider road. There is a great advantage in keeping the water in the ditches at least seven feet from the edge of the improved road, as the water has a tendency to seep into the road, and when it gets to the improved surface, it will cause it to go to pieces. Five miles of improved road in Vance county have gone to pieces this winter and I attribute this largely to the fact that it was not properly maintained. Also this stretch of road was built on soil which had too much mica in it, but I do not think this road would have been bad if it had been dragged immediately after each rain."

Mr. Coble made a report on the maintenance of sand-clay roads in Lee county and stated that his experience with sand-clay roads is that they are not difficult to maintain and that the best method of maintaining them is by using the split log drag.

Mr. R. S. Snowden reported for Craven and Wayne counties that the roads which had been maintained at all kept up well during the bad weather, but those which were not maintained by using the drag went to pieces. He reported that in Craven county two years ago a patrol system of maintenance was begun. This method improved the roads very materially until politics again took control of the roads, which disorganized this system.

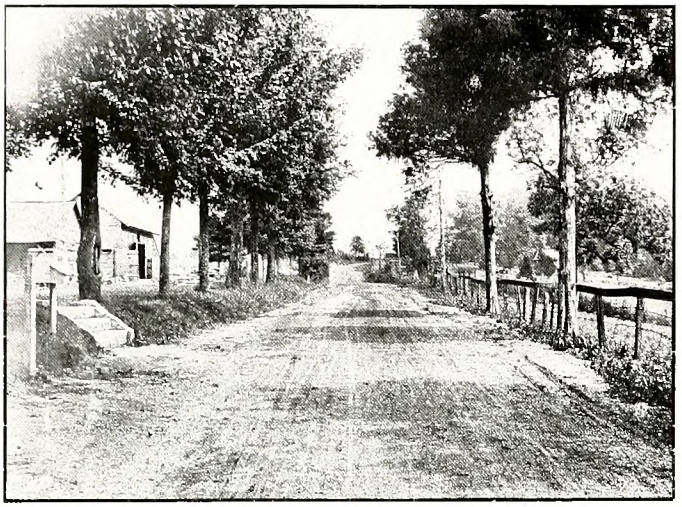
Mr. N. C. Hughes reported for Halifax county. He said that the people in that county had been so anxious to build as many miles of new road as possible that they had given little attention to the subject of maintenance. He stated that in one township in the county, through systematic maintenance, the natural roads had been brought into good condition. As the natural materials of these roads are very good, all that was needed was to shape them up and keep the water off.

North Main Street, Lexington, North Carolina

Mr. Ira B. Mullis reported for Harnett county. He stated that little had been done in the way of maintenance in that county.

Mr. J. A. Davidson reported that the system of maintenance in Guilford county had not been well worked out and is not satisfactory at the present time.

Mr. R. A. Burnett, of New Hanover, reported that they have a system of maintenance for that county which has given good results. They have a maintenance gang to keep the ditches cleaned and which goes over the road after each rain shaping them up and clearing the ditches. It seems that New Hanover county is really the only one in the state at the present time that is carrying out a systematic plan of maintenance by the patrol system.



Forsyth County, North Carolina, Macadam Road, Treated With Asphalt Binder

Mr. J. R. Pennell reported for Greene county. He stated that one reason their sand-clay roads went to pieces there was that they were shaded too much. He states that they are now cutting down every tree that shade the road except those in a man's yard.

Mr. Wythe M. Payton spoke for Vance county, and stated that they had great difficulty in that county in securing surfacing materials of any kind. No systematic maintenance has been done in this county, but for the future they have a fifteen cent tax which will amount to about $2,000 a year for this kind of work. They are now trying to maintain the dirt roads by use of the split log drag.

Mr. C. M. Miller reported for Stokes and Rowan counties and stated that he had had charge of the building of roads in Walnut Cove township of Stokes county. The bond issue bill for this township did not provide for a maintenance fund. Mr. Miller reported that in Mount Airy township, Surry county, the roads were maintained with drags and a road machine. He states "in Rowan county we have just lately organized what I believe is one of the biggest road maintenance systems I have been connected with. In this system there is an engineer, a general superintendent and two chain-gang camps. In charge of these camps is a foreman who goes from one to the other and looks after the maintenance work. There is also a patrol system with a man in each township who communicates with the road superintendent by 'phone in connection with road maintenance."

Mr. J. W. Martin reported for Edgecombe and Columbus counties.

Mr. N. C. Hughes, road engineer, of Halifax county, then gave a paper on "Economical Methods of Moving Earth in Road Construction."

In the afternoon the first paper given was one on "Road Maintenance," by Major W. W. Crosby, highway engineer, of Maryland. He took up in detail the principal points to be observed in the maintenance of the sand-clay or topsoil road, the dirt road and the macadam road.

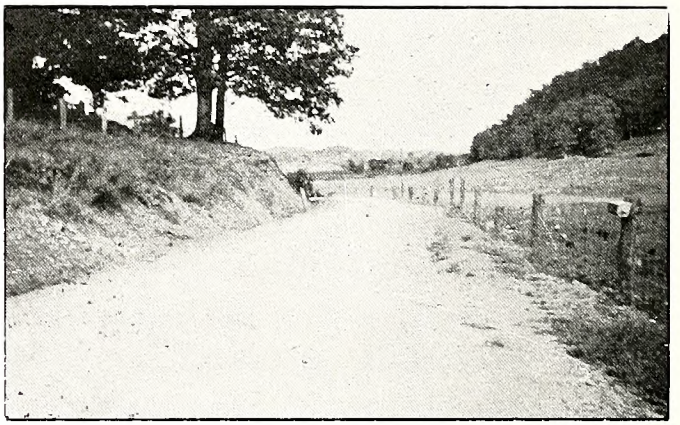
Major Crosby answered many questions in regard to desirable tools in road maintenance, use of glutrin on clay roads, use of bituminous materials on sand-clay roads, and the best methods of application.

The balance of the afternoon was given to a discussion of the relative merits of corrugated metal culverts and terra cotta culverts. There were present representatives of the International Clay Products Bureau, of St. Louis, Newport Rolling Metal Culvert Company, Pomona Terra Cotta Company, Dixie Culvert and Metal Company, Carolina Metal Products Company, and the Salisbury Metal Culvert Company.

On the last day of the institute the question of "The Relations that Should Exist Between State Highway Commission, county highway commission, and township highway commission, and relations of highway engineers to These" was discussed by Director Pratt.

Other subjects discussed were Bridges, Blasting Materials by Dr. J. H. Squires, of the E. I. DuPont de Nemour Power Co., and the question of how to improve the institute, including a discussion of the valne of correspondenec courses, plans of co-operation for the employment of engineers, superintendents, foreman, etc.

The roads institute of 1915 showed a marked increase in attendance, number of counties represented and freedom of discussions of subjects over that of 1914. It is believed the continuance of this institute will be of inestimable value to the road work of North Carolina.



A Model of Macadam Construction in Russell County, Virginia

Davidson county, N. C., will have available for road work at an early date $300,000. The new road commission is composed of Dr. J. W. Peacock, of Thomasville, chairman; Mr. Lee V. Phillips, Lexington, secretary; Mr. J. W. Lambeth, Thomasville, treasurer; Dr. E. J. Buchanan, Lexington; Mr. L. A. Smith, of Linwood; Mr. T. H. Livengood, Winston-Salem, R. 5. Bids have been asked for and active preparations are going forward.

Greenville, S. C., will vote this month on a bond issue of $100,000 to improve streets.

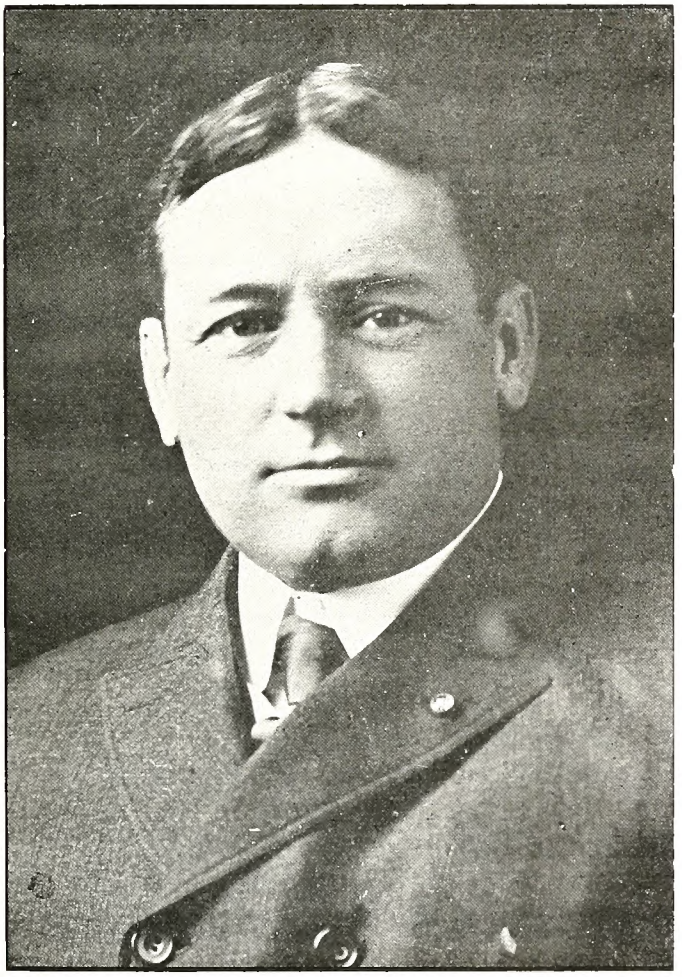
Types of Pavements Suitable for Use in the South

By MAJ. W. W. CROSBY

Former Highway Engineer of Maryland, Baltimore, Md.

THERE can be no question but that, in view of the progress made in the last few years toward general agreement, first, that road improvement should be had and, second, that certain standards should be followed in the construction of any road way or pavement, that the selection of the type of roadway or pavement for any particular case is of primary importance.

With more than fifty million dollars of borrowed money now ready to be expended for road improvement



MAJ. W. W. CROSBY

in the southern states, the immediate importance there of the question from the financial side alone can be readily seen. Further, if we admit, as we must, that upon the satisfaction with the results from this expenture will depend not only the answer to the question of going further in this matter—and the fifty millions is really but a beginning of the vast work probable and desired to be done—but also depend the results to be expected from further provisions of larger funds, the real importance of the proper selections from the many types of good road surfacings may be estimated.

That there is no one best type of roadway is readily explained in spite of the arguments of promoters employed by manufacturers of certain machinery or materials. For instance, it will be admitted without argument that the width of the road-crust or pavement for satisfaction in one case may be required to be quite different in another. The traffic on one road may permit a cheap surface such as sand-clay to be built and maintained with economy and with satisfaction to its users, while in another case local conditions may require for both the construction of a high type of pavement. Again in one case where the materials and machinery required for the maintenance of such a pavement as sheet asphalt, for instance, are readily available, its selection may prove to be economical, but in another case with identical traffic and other conditions but where such materials and machinery are difficult or impracticable to secure, the selection of sheet asphalt might prove unfortunate and the substitution of brick or some other pavement might prove much the wiser in the end.

In the science underlying the art of Highway Engineering, the selection of a pavement to fit best any local conditions is recognized by progressive engineers, and several discussions in the matter have already been published. The writer will not take the space here for a repetition of his views on this point but will merely refer those interested to a paper by him on "The Scientific Selection of Pavements" printed in the "Municipal Journal and Engineer" for May 29th, 1913, page 737, et seq. Suffice it to say here that it is believed that a mathematical method exists which will greatly aid in the proper selection of a pavement or road crust for a particular case when certain local conditions are known, and that this method will strengthen or correct the personal judgment of a competent engineer in arriving at his choice of alternatives available.

Such a number of good road crusts are now so well understood and standardized in their construction that a considerable list is offered, from which to select one or more, so that sufficient competition in price may be had and a final decision made with assurances of reasonable satisfaction and economy. This list covers asphalt pavements, brick pavements, Burnt-Clay, Cement-Concrete, Gravel, Marl, Sampittic, Sand-Clay, Shell, Slag, Stone, Vitrified Cubes, Wood, and possibly some others or some variations of these named.

ASPHALT (Sheet-Asphalt) pavements have not been generally used outside of city streets but, with the recent increase of traffic on highways generally, they may be considered in connection with road improvement. They are very satisfactory in many respects though seemingly expensive in both first cost and maintenance. Also, they require special machinery and tools for both. Variation from certain well established principles of their construction is unsafe. For instance, certain necessary qualities of the asphaltic cement, of the sand and its grading, and of the work itself must be had. The wearing surface must rest upon

A paper read before the A. A. A. S. Convention, Atlanta, Ga.

a rigid base if it is to be successful. Hence a sufficient artificial foundation of concrete or of firm, thoroughly consolidated paving or macadam must be provided, often at a considerable cost. On the other hand a new heavy concrete base, such as is generally now used on streets, may not always be necessary on roads. Again it may frequently be possible on roads to omit the "binder course" usually used between the base and the wearing surface on streets, thus making a reduction in first cost without serious increase in maintenance costs.

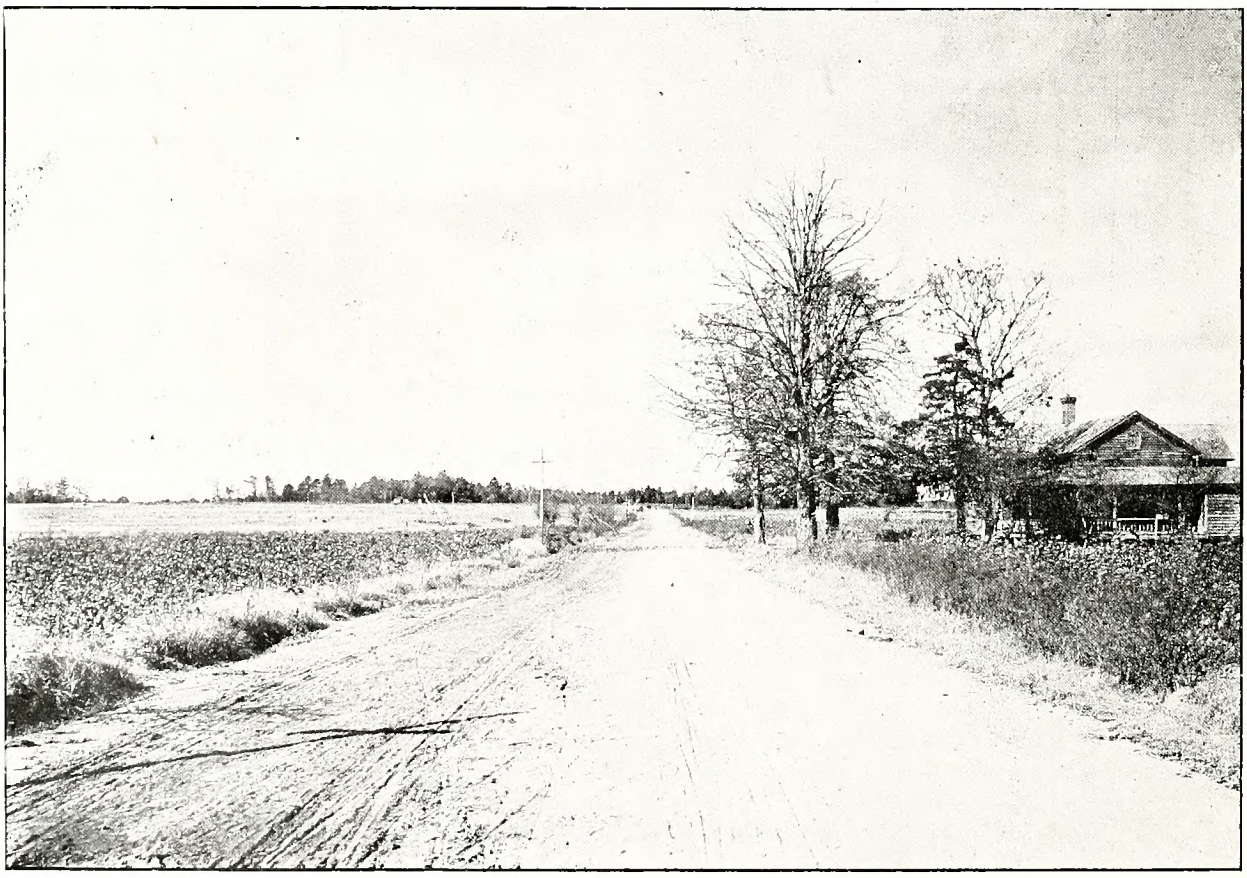
The average cost of a sheet asphalt pavement with a concrete foundation on a city street being taken at $1.75 per square yard, the writer believes it may frequently be possible to reduce to $1.00 or $1.25 the cost of a similar pavement on certain roads, and that, under these and other circumstances and under heavier traffic conditions already prevailing on roads, the selection of sheet asphalt for road surfaces will be in the future much more often justified or dictated than in the past.

BRICK PAVEMENTS have, until rather recently, been generally considered as belonging only to streets, but traffic demands have extended them also to roads. A further extension of their use seems to the writer probable because of the growing recognition of the fact that quite frequently the customary provision on streets of a concrete base for the brick pavement may be safely dispensed with in many instances of road work with entire satisfaction in results and of course with considerable reduction in first cost.

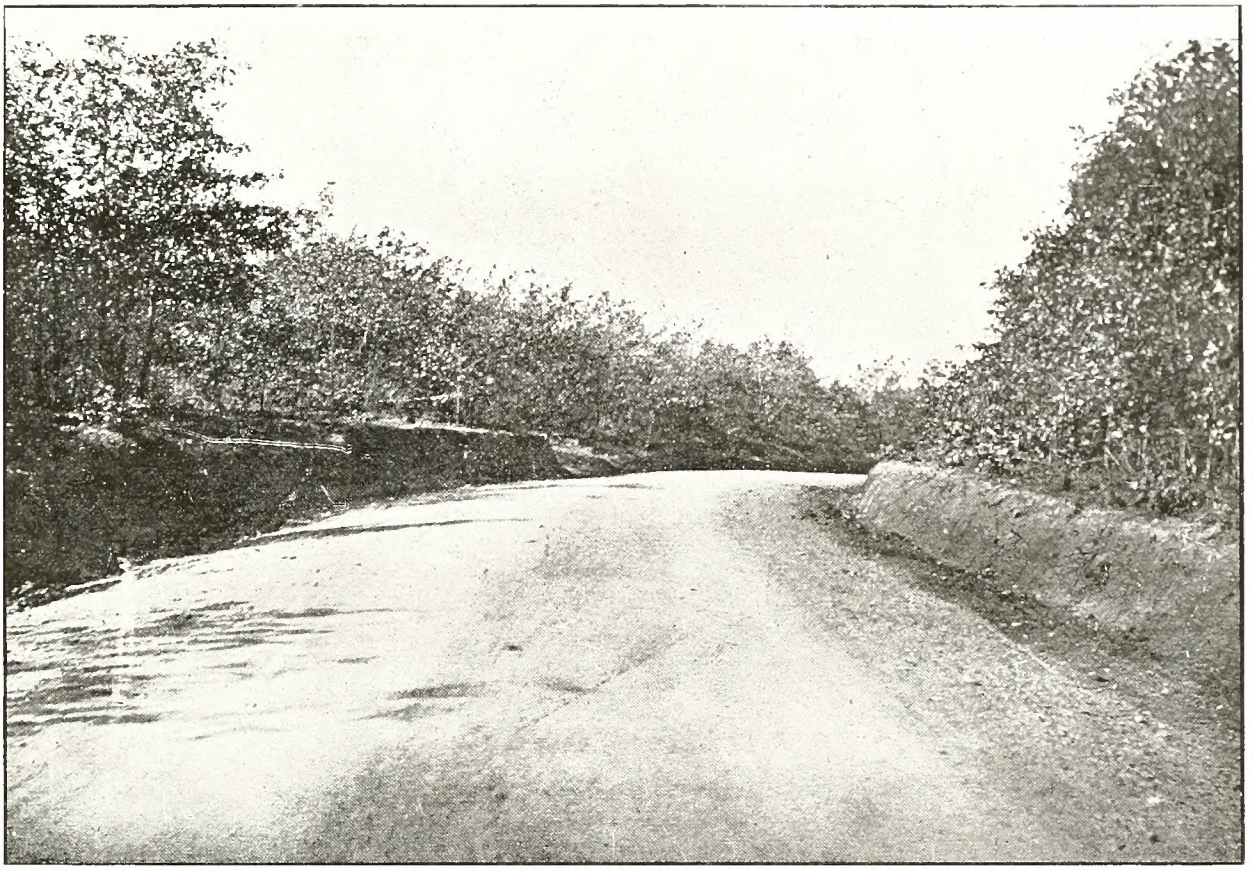
The earlier brick pavements were laid without a concrete base. Later one was almost always provided Now some of the older ones (without the concrete base) have shown up so well in the records of cost and service that highway officials are generally beginning to see that some local conditions may safely permit the omission of the expensive base, or the substitution of a cheaper one for it, with economy. Hence, the field of brick pavements has been extended and the writer believes it may be now capable, under all the conditions prevailing or about to arrive, of further extension in road work. Some sandy roads where no base other than that to be furnished by the well compacted native material would be necessary—might be most satisfactorily and economically surfaced with a brick pavement. Assuming that a first class Brick Pavement on a six inch concrete base will cost $2.25 per square yard, the cost of a suitable similar pavement on a road where local conditions will safely permit the omission of the concrete base, may be reduced to as low as $1.50 per square yard, and the cost of such a pavement will probably lie generally between these figures.

BURNT CLAY roads—as developed by the U. S. Office of Public Roads—should certainly be considered in a list of road crusts available for the southern states. They of course are limited to localities where conditions are favorable to their construction and where the traffic will permit their satisfactory maintenance with reasonable economy. Their selection should be always based upon careful considerable along the scientific lines referred to and of all the circumstances. Their degree of permanence may be relatively small but in this connection a remark or two concerning "permanence" may be perhaps properly made.

It will be well for all to have a clear and distinct understanding that no such thing as a "permanent road" exists or can exist. Permanence is at most merely relative. All road crusts and pavements require maintenance and ultimately restoration. The value of relative permanence in a road crust is measured finan-



One of the Many Fine Macadam Roads Near Charlotte, Mecklenburg County, North Carolina



Between Lynchburg and Rustburg, Campbell County, Virginia. This is a Well-Graded, Finely Built Macadam Road

cially by a comparison between the interest charges on the difference in cost and the difference in cost of maintenance itself under the same conditions of existence. Hence, except for the factor of convenience, a cheap road crust requiring reconstruction every few years even may be as satisfactory and more economical than an expensive one, which, while costing on the average less per year to maintain, in the end costs more because of the large interest charges on its first cost to be included.

It is beginning to be realized among highway officials that, as referred to under the remarks concerning a concrete base for brick pavements, mistakes have been made in the past and are now being made by attempting at large first costs to provide "permanent" payments when even greater economy and as great satisfaction at least would have been had by indulging in lower first costs and expending greater sums for constant maintenance. Hence it may be seen that there is a field for the cheaper type of road-crusts to say nothing of even unsurfaced, but well graded, drained and maintained, earth roads. Burnt Clay road crusts vary in cost but under ordinary conditions where they are possible it is estimated their cost would be about 15 cents per square yard.

In the unreasoning quest for "more permanent roads" the cement concrete road crust or pavement has been revived and widely hailed as the alchemists' stone that is to change all bad roads into perpetually good ones. Those highway authorities, unfamiliar with the experience of thirty years ago with this pavement, who attempted its use have found from their own short experience that even cement-concrete roads had to be maintained and that their maintenance was by no means easy or particularly cheap. In fact, it has been found that in the majority of cases, it has been desirable to protect the concrete from traffic by the construction and maintenance over its surface of a mat or carpet of pitch and gravel or stone chips. The concrete is thus relegated to the position of a foundation and almost all the extra expense for expansion joints, for finishing and smoothing the cement concrete surface, and for extraordinary richness of the cement mortar in it has been thrown away.

Cement concrete as a foundation is most useful, often necessary, but often extravagant. Cement concrete as a road surface exposed itself to traffic is not, and cannot be, of wide application or use with satisfaction and economy. If a cement-concrete is to be soon turned into a foundation for a pitch ("bituminous") carpet, then it will generally be economy to build it as a foundation and not as a surfacing in the first place.

Those who are interested may secure the writer's views on this matter in greater detail by referring to his paper on "Concrete Roads vs. Concrete Foundations," printed in Municipal Journal and Engineer, December, 1913.

Cement Concrete pavements uncarpeted cost about $1.25 per square yard. A carpet on such will cost from five cents to thirty cents additional per square yard. A concrete foundation of the same thickness with a similar carpet built on it would under the same conditions cost between eighty cents and $1.10 per square yard.

GRAVEL Road Crusts may be conveniently and with reason be divided into two kinds—"Gravel Roads" and "Gravel Macadam"—depending for the differentitation on whether the material is used unscreened from the bank or whether, according to the principles of M'Adam, the metal is properly sized (screened,) spread, compacted and then bound, or its interstices filled, by the addition of a just sufficient amount of finer material flushed into the voids with the aid of

water.

The quality of the Gravel Roads depends of course on the quality of the pit gravel. If the latter is composed of good tough stone and has the proper amount and kind of fine material uniformly mixed with it, excellent results may be obtained at a figure as low as 50c. per square yard. Such road crusts are frequently very satisfactory especially when kept properly treated with a bituminous material, or "oiled." Their weakness is their tendency to rut under concentrated traf-

Splendid Type of Sand Clay Road in Nottoway County, Virginia Near the Town of Blackstone

fic, due to the deficiency in the mechanical bond obtainable from the rounded metal, even where the road crust most nearly approaches true macadam, and, in other cases, where the mechanical bond is further weakened by the presence in excess of the fine material.

GRAVEL MACADAM, built with properly screened gravel stones is generally stronger and more durable than a Gravel Road because of the firmer results possible from sizing or screening the metal and compacting it in the absence of fine material, which is afterward added in exactly the right proportions. Their first cost is probably 20c. per square yard greater than for gravel roads. Another advantage had by Gravel Macadam is the opportunity offered for using the penetration method in connection with it, as well as to oil it as in the case of a Gravel Road. Pitch (Gravel) Macadam is a very useful road crust and its first cost under the same conditions as above would probably be about 80c. per square yard.

MARL Roads. Marl, being an earthy mixture of shells, clay, sand, etc., very much like (except that the shells in marl are usually much smaller) the dredged shells referred to later under Shell Roads, may almost be considered as included under the remarks on the latter. Marl roads are relatively cheap in first cost and high in maintenance costs but frequently are worth consideration under peculiar local conditions.

SAMPITTIC ROADS. The writer may be pardoned perhaps for using, for convenience, a word coined by him to mean a mixture of sand and pitch(using the latter term in its broadest and oldest sense.) Sampittic road crusts may be built in two ways by mixing the pitch with the sandy material in situ, or by mixing, off the roadway, the materials and then placing the mixture on the roadway. Usually the latter method gives more uniform and better results. The mixture may be made in either case with or without heating one or both of the materials, according to circumstances. Those interested can secure further details by referring to articles by the writer printed in the transactions of the American Society of Civil Engineers, Volume LXIV, 1909, page 352, and in "Southern Good Roads for February, 1912, page 12. The results from this road crust so far have been encouraging as to its possibilities. Its cost varies between thirty and sixty cents per square yard.

SAND CLAY road crusts have not, in the opinion of the writer, been used to anything like the extent they should be in the southern states. Their extreme cheapness in first cost should commend them for careful consideration more generally, and, as a better appreciation of the need of all road crusts for maintenance develops, and, as a better understanding of the relations between first cost, maintenance cost, and total cost is had, the writer believes the sand clay road will be found of much wider application than at present agreed. Their first cost is often as low as 10c. per square yard.

SHELL Road Crusts, like Gravel will be considered under two heads—"Shell Roads" and "Shell Macadam." In many localities through the south a mixture of shells with sand, silt, etc., is obtained by dredging in the streams and is frequently available at low cost. This mixture, when containing a sufficient proportion of shells and properly applied, furnishes frequently a very satisfactory road crust for light traffic at a first cost of, say, 20c. per square yard. It is, however, liable to loosening in dry weather unless "Oiled" and readily becomes "horse pathed" under periodic horse drawn traffic in one direction.

Shell Macadam is built, as in the case of broken stone or gravel macadam, from the shells themselves—obtainable from shell heaps at the canning factories or elsewhere—spread, compacted, and then the voids fill-

Hard-Surface Marl Road, Near Jacksonville, Fla.

ed with sand or similar material by the aid of water or other liquids. Using the shells in this way, just as if they were broken stone, secures the greatest value from them and the shell macadam so formed is light, strong, reasonably resistant, and particularly valuable for moderate traffic on sandy roads. The addition of pitch by the penetration method is also successfully made to shell macadam and it is easily practicable to construct and maintain a pitch (or bituminous) carpet on the top of shell macadam, which will add greatly to its field. In the cases where pitch is so used, the finer mineral material to go with the pitch should preferably be clean pea gravel or stone chips rather than fine sand. Shell macadam has a pleasant resiliency not possessed by either gravel or broken stone macadam. Its first cost (waterbound)—depending of course on the price of the shells—will vary between 25c. and 50c. per square yard.

SLAG Road Crusts. Again we may separate the consideration into "Slag Roads" and "Slag Macadam."

Basic Slag, direct from the pile or dump, because of its heterogenous character usually gives unsatisfactory results on the road though it possesses the valuable quality of setting up like cement and forming a concrete-like road-crust capable of supporting heavy loads. But no matter how carefully spread and rolled, its final compaction after being subjected to traffic and weathering is generally very uneven. The fine portions, the cellular or honey-comb like fragments, the massive fragments and the different size particles all give different results. Hence the use of slag direct from the pile has been practically abandoned for road crusts.

If now the slag can, as is sometimes the case, be obtained broken to size and screened as is broken stone, it then becomes possible to use such slag for making macadam, frequently to great advantage because of its cheapness and because of its capacity for strongly cementing together to form a road crust highly resistant to displacement under heavy loads and to ravelling in dry weather. Waterbound slag macadam is inclined to dustiness but this dust is obliterated by the first heavy rain as in the case of shell macadam, the dust recementing when sufficient water is added to it. The first cost of slag macadam may be as low as 50c. per square yard. The use of pitch by the penetration method with slag macadam presents no unusual points for consideration here.

The above remarks concerning slag are intended to cover only that known as "Basic" Slag. "Acid" Slags are not fit for road crusts except in rare cases and when pitch is used in connection with them, as they are vitreous, too brittle, and lack cementing qualities. They may rarely be used in the first course or foundation as a substitute for broken stone or gravel.

STONE. Stone road crusts, or pavements, are perhaps of the greatest general familiarity. For convenience let the consideration be approached under three heads—"Broken Stone Roads," "Broken Stone Macadam" and "Stone Block Pavements."

Broken Stone Roads, of which the crusts was formed by a layer of crusher-run stone or of stone "napped" in place, with or without a covering of earth from the roadside or of a layer of gravelly material, have practically disappeared from the list of road crusts now being built by progressive localities. The inefficiency of these methods and the almost invariable dissatisfaction to be expected from the results have become evident, and further consideration under this head may be omitted from this paper.

Broken Stone Macadam, consisting of sized, compacted, and bound crushed or hand-broken stone, is one of the most valuable of road crusts and one of the most ubiquitous. Strengthened and otherwise improved by the addition of pitch, either through the penetration method or by the application of a pitch carpet to its surface after construction, its value is increased and its field extended. That "the macadam road is dead" as has been, the writer feels, irrationally stated, may be seriously questioned. With better road maintenance and with the advent of the use of pitch on roads either by its injection into or its use on top to form a wearing surface, it seems as though the field for macadam had on the contrary been enlarged. The first cost of broken stone macadam (water-bound) runs between fifty and ninety cents per square yard in most cases and the use of pitch will increase the first cost by from five to thirty cents per square yard.

Stone Block Pavements may be considered to cover here the usual Cobbles and Belgian Block, as well as the new kinds of small blocks ("Durax" or "Kleinflaster"). Cobble pavements whether of true "cobblers" stones" or of quarry spalls are properly disappearing. The tendency in block pavements is to use better dressed blocks of softer stone than heretofore and, where procurable at a reasonable cost, to use smaller blocks. The small block has many advantages and is undoubtedly a coming pavement. Cobble pavements usually laid without a concrete base, cost about 75c. per square yard, ordinary stone block, about $2.50 (with a concrete base $3.00) per square yard, and the new small stone block on a concrete base about $3.50 at present. The question whether or not a concrete base should be used depends on local conditions for its answer, and is one which should always be carefully considered in the light of such conditions.

VITRIFIED CUBE PAVEMENTS. What may be regarded as a novelty in many quarters may be offered by cubes of vitrified clay, but in some localities, where other materials are hard to get, and suitable clay is readily available this form of pavement may offer advantages.

The cubes are made as are vitrified brick, but, being but two inches or thereabouts, each way they are readily laid in place on the prepared foundation by rakes and in quantities instead of being placed by hand separately. They are then rammed or lightly rolled to a true surface and grouted with pitch or cement mortar. The pavement has been tried to a limited extent and has there given surprisingly good results. The writer believes there is a considerable field for it. Its cost depends so much upon local conditions and future developments that it is impossible to state it in figures here. The first cost should be considerably below that of a brick pavement, and the cube pavement should, and seems to, have some other advantages over the brick in many cases.

WOOD PAVEMENTS. After many experiments the wood pavements seem to have resolved themselves into one form—i. e., of rectangular wood blocks treated with a pitchy material and laid on a proper foundation or base such as one of cement concrete. In this form they have properly come to be recognized as a pavement of high value for certain local conditions. The most frequent and serious objection raised against them is that of being slippery, but objectionable slipperiness seems to decrease to a considerable extent with increase of familiarity with them on the part of draught animals, and a further decrease on this score would be had, as well as decrease in first cost, by using less of the pitchy preservative per cubic foot of wood in treating the blocks, by using softer wood, and by keeping, as practiced abroad, the pavement surface gritty with stone chips or pea gravel. The first cost of wood block pavements on a concrete base is now from $3.00 to $3.50 per square yard and when above suggestions are followed it should be reduced appreciably.

PITCH SURFACES. All but two or three of the above referred to types of crusts readily lend themselves to that most valuable development of recent years for extending the field of each crust—the pitch, or "bituminous," surface treatment. This consists simply of building on the normal crust a carpet or mat of pitch mixed with pea gravel or stone chips, the former generally giving better results. This treatment of old roads had had a great success abroad—in England particulary—where the already existing macadam roads were wearing badly under the increasing motor traffic, and an almost incredibly large amount of such traffic is there economically sustained by such carpets. On the other hand horse-drawn traffic is especially destructive to them so that their successful use is limited

by the amount of the latter. When such a carpet is provided all the wear comes on it and the preservation of the road is mainly, if not wholly, the question of maintaining the carpet in satisfactory condition. The cost of carpeting is between five and twenty cents per square yard, and their maintenance questions, those of local conditions.

PITCH MACADAM. Another use of pitch for extending the field of many types of road-crusts has been briefly referred to under the expressions "penetration method" and "pitch macadam". Perhaps it is unnecessary to go into great detail concerning this substitution of a proper pitch for the finer material used with water for filling the interstices of the road metal in ordinary macadam. Suffice to say that pitch macadam so built seems to have many advantages and wider application under modern traffic than the water-bound macadam. The first cost of the pitch in place is from 20 cents to 30 cents per square yard additional to the cost of water-bound macadam under the same conditions.

PITCH CONCRETE. Pitch (or bituminous) concrete made by mixing together before placing pitch, stone or gravel, and sand and then spreading and compacting to form a road crust has proved of great value under certain traffic and other conditions. A variety of formulae for the mixture exists and the proper selection of the one to fit best the conditions of any case is desirable. The cost of such a road-crust varies between $1.25 and $2.50 per square yard in place.

In this paper, already too long, justice has not been done to the many excellent variations in one way or another from the typical road crusts mentioned. Such variations, more or less radical, are possible in the cases of most of the types named. They may and should be made so as to fit best the peculiar conditions of any particular case and when so made of course have their greatest value.

It is the problem of selecting the particular type (or variation from a standard type) of road crust to fit best the local conditions that is now most important for road authorities provided with funds for road improvement. And in the Southern States where such funds have been generously provided the authorities in charge of them will do well to consider this fact and to profit by the experience of others. At the same time, due consideration should be given to the peculiar conditions prevailing, which differ from those in New York and New England, where the heat is not so severe on the roads in summer, where the frost action in winter is more severe, where the road crusts are frequently protected by snow for weeks or months each year where heavy hauling does not severely test the roadways during a season, when, from the presence of an excessive wetness, the road crusts are least able to sustain such strains without damage, where excessively narrow tires and heavy loads are hauled by six or eight animals may be common, more or less, and where the more gravelly or rocky character of the subgrade in many cases gives better opportunities for securing sufficient road foundations than do the rich agricultural soils of the Sunny South.

Yadkin county, N. C., defeated a bond issue for good roads by a small majority. The county will issue bonds for $60,000 to build one good road entirely through the county. This expenditure will result from a bill passed at the instance of Representative Carter Williams, of Yadkin in the last General Assembly, empowering and directing the sale of the bonds and the building of the road.

The Sand-Clay Roads of Virginia.

When Mr. Z. G. Durfey, one of the superintendents of roads in Virginia was asked to speak on the proper construction of sand-clay roads at the recent meeting of the Virginia Road Builders' Association, Mr. Coeke, president of the Virginia road builders association said that certainly not in the United States existed a man as well equipped to build a common, serviceable road.

Mr. Durfey said in part that there were several kinds of sand-clay roads in Virginia and a large percentage of them were bad and very few of them could withstand the severe strain that had been placed upon them this winter. The roads that were made of clay without sand were bad and equally bad were those made with sand without clay. The clay must be taken from the hilly parts and placed in the valleys and the sand which accumulated in the valleys should be taken up to the clay sections of the hills.

In many parts of Virginia and of the south the districts had no good road building material and the hauling of material from a distance was out of the question. With all his experience he knew of no infallible rule to work by; the most essential thing was a foreman with brains who would faithfully follow the specifications laid down for his guidance in that particular district. Good material was no more valuable than good judgment in the use of that material. To the ordinary man all clay looks alike, and the average man cannot draw fine distinctions in sand; yet there is a difference, and this difference shows itself in the difference between a good road and a bad road within a year after construction.

The sand should be coarse and the clay tenacious; the proportions should be about 85 per cent sand and 15 per cent clay; yet this proportion must always be subject to the nature of the clay and the sand and also to observe local conditions. The road should not be built in very dry weather, or the materials will not bind together. The best sand-clay roads are made in comparatively wet weather. The narrow road is always best. The subsoil should first be plowed up, disked and dragged into the right shape with an evenly rounded top. A road cannot be built in a day or a week or a month; it takes a year at least to build up a road so that permanence follow its construction.
road so that permanence will follow its construction.
after they were built and unless something was done soon the roads of the state would be ruined irreparably. At present we needed legislation to control traffic and we needed it now more than ever because the conditions were continually changing and the roads were being subjected to an ever increasing strain.

Mr. Durfey spoke forcefully after half a century's experience in road building, and his advice and warning will bear fruit in the near future, especially in those sections where only sand-clay roads are possible.

American Automobile Association clubs throughout the country are making extensive preparations for what promises to be the liveliest touring season since the introduction of the self propelled vehicle. At the two national clearing houses, in New York City and Washington, D. C., the volume of inquries has been astounding, according to Chairman F. X. Mudd, of the A. A. A. touring board, who predicts in 1915, a wonderful roads intermingling of the people of the several states.

All trucks now in the field for the allies are being painted grey. This color has been found more serviceable and less conspicious.

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A WISE LEGISLATOR.

In the North Carolina department of this issue, appears the photograph of Mr. C. H. B. Leonard, representative in the North Carolina General Assembly from Davidson county. Representative Leonard introduced and secured the passage of a bill appointing a road commission for Davidson county and empowering and directing that commission to issue bonds in the sum of $300,000 for the building of roads.

Inasmuch as Southern Good Roads is published at Lexington, the capital of Davidson county, we rejoice exceedingly because of Mr. Leonard's bill. It gives us pleasure to record good roads progress in any part of our great Southland but this comes closer home and is the biggest thing that has ever happened to us. Our good county has been slow, very slow, to wake up. Every county bordering on Davidson has done a great deal of good road work but Davidson remained in the mud, apparently content with mud. Two years ago a bond election, calling for an issue of $300,000 for roads, was overwhelmingly defeated and the progressive citizens of the county gave up in despair.

Then came Representative Leonard. Without consulting his party leaders—he is a republican—and without making any big noise about it, he put through the bill providing for the $300,000 bond issue and Davidson county will have god roads, whether she wants them or not.

Of course, something might happen to delay progress. The anti-progress element of the county immediately got busy after the passage of the bill had been announced and tried to secure its repeal at the hands of the legislature. Failing in this they started legal proceedings to restrain the highway commission from issuing the bonds. A temporary restraining order, issued by Judge C. C. Lyon, was dissolved and the case was sent on to the Supreme Court, where a hearing was scheduled for April 6. There is little doubt but that the decision of Judge Lyon will be upheld and the new road law placed in operation at once.

And it will be a great day for Davidson county when the work begins. There have been indignation meetings and much wild talk but in all of this Representative Leonard has been unmoved. He firmly believes that what he has done is for the best interests of Davidson county and that his fellow-citizens will come to realize this within a few years at the most. In fact, he expects them to come around to his way of thinking within a few months.

Representative Leonard has acted wisely. He has set an example that other legislators in this and other states, should follow. If your county, Mr. Legislator, is not progressive and will not set herself to the task of achieving progressiveness, see to it that progress is thrust upon her. It may start a row but in the end your people will "rise up and call you blessed."

Of course, it is always best to put the people into the movement first, if it is possible to interest them in it, but sometimes it is necessary to strike out and go it alone. That is what Mr. Leonard has done in this instance. He has set a pace for progressive legislators everywhere and we hope that his example will do good.

PROGRESS EVERYWHERE.

From all parts of the South come the most encouraging reports. Business is improving rapidly along all lines. Cotton is climbing steadily and is now around 9 cents, spring is here and everybody is happy.

In the road-building world, there is unbounded activity. North Carolina at last boasts a state highway commission. Arkansas, Oklahoma, Kentucky, Virginia and several other Southern states have greatly strengthened their state highway departments and big work is being planned for the remainder of the year. Practically every Southern legislature that has met this year has done great things for the good roads cause.

There is no room in the South for the pessimist and knocker. There is no reason for the existence of either, for there is nothing to be blue about and so very few things that deserve knocking that knockers just naturally get ashamed of themselves and quit.

The South has been spending immense sums of money in road-building during the past decade. What the next decade will show in the way of road expenditures cannot be calculated, for the good roads leaven is working in this bright, beautiful sunny land of ours and the spirit of progress is rampant in Dixie.

NORTH CAROLINA HIGHWAY COMMISSION.

As stated in the March number of this magazine the bill to create a state highway commission for North Carolina suffered much at the hands of penny-wise legislators. Originally providing for an appropriation of $30,000 for support of the commission, it got through with only $10,000 for annual maintenance.

The commission organized for business on the last day of March and elected Mr. W. S. Fallis, of Henderson, state highway engineer. The commission could have made no better choice, for Mr. Fallis is one of the best road engineers in the South, a man of large vision and a natural leader of men. Even with the pitifully small appropriation provided for the up-keep of his department, Mr. Fallis will do much for North Carolina.

It is cause for rejoicing among good roads advocates all over the state that North Carolina has at last made a start toward the adoption of business methods in road improvement. As the usefulness of the highway commission and its engineer become more and more apparent perhaps North Carolina's legislators will not be afraid to invest a little more money in it.

State Highway Commission Organizes.

The North Carolina State Highway Commission, authorized by legislative act, organized and got down to business on March 31. Of this commission the governor

C. H. B. LEONARD
Representative from Davidson County in North Carolina General Assembly

and state geologist are ex-officio members. The law required that one of the members be from the engineering department of the University of North Carolina and another from the same department of the N. C. A. & M. College. The governor is charged with the duty of appointing the members of the commission, who are as follows:

Governor Locke Craig and Dr. Joseph Hyde Pratt, state geologist, ex-officio members; Prof. W. C. Riddick, A. & M. College; Prof. T. F. Hickerson, University of North Carolina; Hon. E. C. Duncan, of Beaufort; Mr. Guy V. Roberts, of Asheville; Col. Benehan Cameron, of Stagville.

The commission organized at Raleigh March 31, electing Governor Craig chairman and Colonel Cameron, chairman protem and active head of the commission, Dr. Pratt secretary.

Mr. W. S. Fallis, of Henderson, was elected state highway engineer. Mr. Fallis is an experienced highway builder who has done fine service in many sections of the state and has been for a long while closely identified with North Carolina highway construction. He built the famous highways in Franklin, Youngsville and Leesville sections of Vance county, and has given expert assistance in road building in Columbus, Wilson, Cherokee, Edgecombe, Henderson, Granville, Polk, Rockingham, Onslow, New Hanover, Durham and other counties.

The first work of the commission will be to co-operate with counties that have provided funds for road construction and have made application for engineering assistance. Of these there are about 20 counties ready for business and there will be many others in the near future.

Four Governors to Attend Road Meeting.

Four governors are expected to be present and address the Ozark Trails Good Road association at the annual meeting at Independence, Kans., June 7 and 8. Secretary Adams received a letter recently from Governor Williams, of Oklahoma, that he will attend. Governor Hayes, of Arkansas, Governor Major, of Missouri, and Governor Capper, of Kansas, will be there if they can leave their capitals.

The Ozark Trails Good Road association covers the four states named. The organization was effected at Springfield, Mo., last year. The plan is to thread the Ozark region, the scenic section of the southwest, with fine boulevards and to connect the system with a fine highway between some point in southwest Kansas with the Santa Fe Trail at Emporia, or some point further west.

Georgians Competing for Dixie Highway

Residents along the route of the Dixie highway between Chattanooga and Atlanta are exerting every effort to have the road through Rock Springs, LaFayette, Trion, Summerville and Rome to Cartersville selected. Meetings will be held in all the principal towns and settlements in the various counties along this route, urging concerted action. A committee, composed of C. B. Caperton, of Trion, as chairman; E. P. Hall and J. C. Knox, of LaFayette, John D. Taylor and Cicero Cleghorn, of Summerville, were in Chattanooga recently conferring with members of the Chattanooga Automobile club to learn what they must do to secure the Dixie highway.

As arguments to secure the Dixie highway via Rome, it was stated that a large part of this road had already been built, part of which was constructed by the federal government. They stated that is was only a few miles longer than the road to Atlanta via Dalton, and they felt they would have no difficulty in meeting and overcoming the competition of the residents along the Dalton route. Meetings will be held all along the entire route for the purpose of arousing the enthusiasm of all the citizens.

Boyd county, Ky., will vote on May 1 on a bond issue of $500,000 for road construction.

The Automobile in the South

The auto editor of the Knoxville (Tenn.) Sentinel calls attention to certain mistakes made by the average person in purchasing an automobile. He says that every motorist or would-be motorist, in examining a car touches only the high spots and leaves the details alone, but long life, superior riding and quiet running are as much dependent upon the constructional details as they are upon the usually considered important units. For example, take the propeller shaft of a car. Very few prospective owners, if any, make any attempt to ascertain the construction of this shaft, taking it for granted to be a solid bar of steel with strength enough to outlive any other part of the car's mechanism. But the observer forgets that the shaft if improperly made can ruin not only itself but other parts of the car as well, and to go farther may help considerably to make the vehicle noisy and inefficient.

Every shaft has what is called a critical speed; that is, a speed beyond which it is not safe to rotate the shaft. This critical speed is determined somewhat by the weight of the shaft and its dimensions.

As an illustration take a popular light make. This car, instead of using a large, heavy drive shaft, has a lightweight tubular shaft. The critical speed of a tubular shaft is much higher than that of a solid shaft of the same weight. The operation of a propeller shaft has its critical speed means added wear on the universals, misalingment, and hence loss of power and at the same time the driving pinion bearings are affected, and hence the rear axle gears will become noisy.

Most solid shafts reach their critical speeds in ordinary work, but it would take twice as much as any motor made could give to cause the tubular shaft to fall out of line and injure the universals or bearings. You have heard of "whipping." It is a term referring to a roating shaft and means the point at which the critical speed is reached, or the point where the shaft tends to bend of its own weight—loop like a child's skipping rope. It is obvious that a light, hollow strong shaft has no bending point within range of that of a solid shaft. Tubular propeller shaft construction is being recognized by many makers now, but too late for use in their present models.

* * *

All the motor factories of Germany are under government control, and the work being done is in the hands of the military authorities.

* * *

The Increase in the Number of Automobiles.

The past year has shown an enormous increase in the number of motor cars in the United States, nearly 700,000 more automobiles having been registered in the various states. The total number for 1914 is 1,808,441, from which the receipts were $511,926,295.56. The largest receipts were from New York, amounting to $1,527,396.36; California coming next, with $1,338,424.50, and Pennsylvania third, with $1,184,657.50. No other states reached the $1,000,000 mark. Blanks in the following table indicate that no figures were available:

State	1914.	1913.
New York	168,039	132,519
Illinois	132,199	95,532
California	122,625	.....
Ohio	122,071	86,153
Pennsylvania	112,000	79,846
Iowa	106,250	77,369
Massachusetts	77,246	57,197
Texas (estimated)	77,000	28,000
Michigan	76,325	41,394
Indiana	66,500	61,177
New Jersey	59,637	50,491
Missouri	54,537	39,541
Wisconsin	53,161	34,637
Nebraska	51,242	34,943
Kansas	50,107	12,937
Washington	29,650	21,000
Connecticut	29,317	20,136
Minnesota	23,000	45,054
South Dakota	21,385	14,700
Maryland	21,026	12,567
Georgia	20,905	12,919
District of Columbia (Fiscal year)	5,639	11,614
Colorado	17,851	13,297
North Dakota	17,349	12,504
Oregon	16,347	14,114
Maine	16,025	11,112
Maine	16,025	11,112
North Carolna (since July 1)	14,719	7,710
South Carolina	14,000	.....
Virginia	13,984	9,023
Rhode Island	13,058	10,000
Oklahoma	13,000	.....
Kentucky	11,750	7,551
New Hampshire	10,596	7,254
Montana	10,215	6,102
Vermont	8,254	5,913
West Vrginia (since July 1)	8,215	5,007
Alabama	8,048	5,314
Arkansas	5,635	5,100
Tennessee	5,470	8,900
Arizona (estimated)	5,000	3,132
Idaho (estimated)	3,480	2,026
Florida	3,368	3,720
New Mexico	3,090	1,972
Delaware	3,050	2,145
Utah	2,203	3,400
Mississippi (estimated)	1,800	2,217
Nevada	1,550	1,141
Totals	1,808,441	1,127,940

* * *

Honolulu is taking American cars. Nearly every steamer brings to the Hawaiian port a consignment.

GOOD ROADS NOTES GATHERED HERE and THERE

Arkansas.

The Little Rock Democrat is rejoicing mightily over information from the office of the highway commission of Arkansas that as a result of the passing of the Alexander bill, more highways will be built in "the next twelve months than have been built in the last twenty years." This is gratifying indeed to the good roads enthusiasts of the state, who have struggled, often under difficulty, to "help pull Arkansas out of the mud."

Because of a technical flaw in the old road law governing the method of creating road districts, and being uncertain as to the proper manner of issuing bonds, road district issues have been very unstable financial paper and extreme difficulty has been encountered in disposing of the bonds of any district. In fact, so difficult was it to induce bond buyers to take hold of the issues that virtually no bonds have been issued in many counties, and as a consequence road improvement has suffered and construction work has stood at worse than a standstill.

The County Judges' Association of Arkansas, which met in Little Rock in January, realized the difficulty of improving county roads under existing statutes and the members devoted virtually all of their time in session to investigating ways and means of providing a statute which would protect the resident, insure good construction and safeguard the bond issues for construction purposes. As a result the bill which was introduced by Mr. Alexander of Mississippi county had been threshed out and formulated by men who are familiar with the actual working conditions confronting those who attempted to authorize bond issues, and from the numerous actual problems in their experience were able to guard against the incurson of future serious flaws to an extent larger, perhaps, than any other single organization could have forecasted.

According to Highway Commissioner Owen, the highway department has been advised that between 500 and 600 miles of road will be improved within the next year or year and a half, and many road districts now contemplated will be organized. With the old districts and the new districts working together, it is predicted that construction will be done on approximately 1,000 miles of highway during the coming eighteen months, and more than $5,000,000 expended in such work.

* * *

Kentucky.

To the voters of Kentucky there is to be submitted this autumn an amendment to the state constitution which will make it possible for the prisoners of the state to labor outside of the prison walls on roads and other public works. The state constitution at present prohibits the use of prisoners outside of prison walls, and their labor is leased to contractors under the old system, which is now being generally regarded as slavery and abandoned.

Two years ago, an amendment providing for the employment of prisoners in road work in Kentucky was voted upon and carried by a large majority, but, unfortunately, not advertised within the required time, and in consequence the courts decided the act unconstitutional. The legislature, which met in the winter of 1914, provided that the amendment be resubmitted to the voters, so this year the citizens of Kentucky will again be called upon to decide the fate of the prisoners.

In the meantime the contracts at the prison expired and a strong effort was made to have them renewed for a term of years. Owing to the persisteney of the labor representatives; Miss Linda Neville, the Kentucky representative on Prisons and Prison Labor; the Warden of the Penitentiary and others, renewal of contracts was made for one year only; hence there will be nothing to hinder the development of the road work, once the amendment is carried.

Already several of the candidates for governor have declared themselves opposed to the contract system, and the national committee on prisons and prison labor believe the road amendment will carry by a very large majority.

Kentucky will then be in a position to afford her convicts an opportunity to regain their strength and manhood through healthful outdoor work, similar to that which Colorado has given to the men who built the famous "Sky Line Drive."

* * *

Oklahoma.

Good roads in Oklahoma are to become a reality according to the champions of the administration roads and highways bill, which is the last big measure to become a law at this session of the legislature.

The bill provides a comprehensive scheme of state and county road building. The present department of highways is retained and is to be in charge of a highway commissioner, but the duties of the latter officer are considerably changed and the jurisdiction of the department is broadened.

* * *

Missouri.

The system of state dragged roads is enlarged approximately six thousand miles by the passage of three senate road bills by the house of representatives. The bills were introduced by Senator Bronson and Senator Rodgers, but were sponsored by Lieutenant Governor Painter, who "fathered" the county seat highway drag law of two years ago.

The principal bill of the series establishes a system of "Class B" roads in each county, to be dragged in connection with the county seat highways.

The system of state dragged highways now connects each county seat in the state and constitutes a system of twelve thousand miles. Class B roads are to be designated, connecting the most populous towns of the county with the county seat highway and with each other. The bill provides that each county shall be entitled to have one-half as many miles of Class B roads as it now has miles of county seat highway. The state agrees to appropriate $10 a mile for dragging the Class B roads. It now appropriates $15 a mile for dragging the Class A, or county seat, highways.

The second bill of the series provides that the state highway commissioner shall have the right to bring proceedings to condemn land to widen or straighten the county seat highway roads. The third bill changes the present law by which state road funds can be ex-

pended for making permanent improvements to add oiling to the list of purposes for which the money may be spent.

These bills already have passed the senate and only await the governor's signature to become law. They probably will make up all the road legislation of the present session.

The house passed a fourth bill by Representative Stevens of Johnson county, which provides a system of working convicts on the road. It outlines a complete plan of establishing convict camps. The bill has yet to pass the senate.

* * *

Texas.

A public highway from Dallas to Austin will likely be begun within a few months, according to a letter from D. E. Colp, secretary of the Bexar County Highway League and Secretary and treasurer of the Texas Good Roads Association.

Plans for building the road along the lines of the Austin-San Atonio post road will be launched in Dallas soon, it was announced.

It is pointed out that a road from San Antonio to Laredo will be completed Sept. 1, which will equal the post road in the matter of service and beauty.

The completion of a road from Dallas to Austin would connect North Texas with South Texas in one of the best highways in the United States. Thousands of tourists would travel this highway every year, Mr. Colp states.

* * *

Virginia.

After considerable delay and strenuous opposition from those who did not favor the necessary bond issues, improved roads in the Blacksburg Magisterial District, and a new school building are assured. The campaign previous to the first bond issue in March, 1914, was made under the direction of the Blacksburg Board of Trade and financed by subscriptions from its members and other citizens of the district; the amount voted for was $115,000, and the legality of the election was contested by the opposing faction. Judge W. W. Moffett, ruled that the election was in accordance with law. Other obstacles in the way have recently been removed and the ultimate success of the movement is now a certainty.

Thirty-five thousand dollars' worth of road bonds have been sold, this amount being deemed sufficient to start the work, and the rest will be issued from time to time as becomes necessary. Convict labor has been secured for the road construction. It is estimated that two years will be required to complete the road work designated in the petition for the election and the money required by law to be set aside for a sinking fund, put out at 4 per cent interest, will amount in thirty-two years to a sufficient sum to retire these bonds, leaving the district free of debt, as far as this issue is concerned.

The roads to be improved are the most traveled in the country; some leading to the principal coal mines, touching a section rich in farming and mineral lands, but heretofore inaccessible on account of bad roads for much of the year, and others that will open up communication with parts of the county rich in possibilities of development, but too far away from the towns and railroads to make dairying, fruit growing or truck raising profitable for the land owners. The roads to be improved total twenty-seven miles of macadam and six miles of grading. Bridges are to be built, and the dirt roads regraded wherever possible. The board of supervisors will be responsible for the expenditure of the money, and the work will be done under the supervision of the State Highway Commission.

Twelve thousand and five hundred dollars is the amount now available for the new school building in Blacksburg; $1,500 having been paid for about two and one-half acres of land adjoining the present school property.

The success of this movement for good roads in the district and adequate school facilities in the town marks a long step forward in the progress of the people along educational and industrial lines.

Recommendations of Hon. C. B. Scott as to Road Work in Virginia.

Mr. C. B. Scott, assistant state highway commissioner of Virginia, before the Virginia Road Builders Association, spoke on needed regulations on through country roads. He said that many cities in the United States and many foreign countries have found it necessary to secure control of all vehicular traffic on roads. This was done by a tax according to the width of tire and the weight of the load. Throwing trash on roads is absolutely prohibited while traction engines are only permitted under stringent regulation. Automobiles, auto trucks, and even traction engines are absolutely essential to modern life but the state must needs secure control of this traffic and build and maintain roads to meet the change in conditions. He strongly advocated that the boards of supervisors in the various counties be allowed to enforce rules and regulations, subject to the approval of the State Highway Commissioner, for transportation over the highways of their jurisdiction. His suggestion was adopted. A chairman in each district will be appointed, and to him will be left the regulation of the roadways in his district, their management and building.

The following recommendations were offered and adopted.

That all vehicles, standing or in motion on main highways at night, be required to carry a light.

That no one be allowed to pile any material within the right of way of any road without permission from the local authorities.

That suitable penalties be provided to prevent the stopping of ditches and drains.

There was adopted also a resolution concerning the various widths of tires to be used on country highways.

A Good Idea From Danville.

The Danville Chamber of Commerce is doing a good work in encouraging the farmers on the roads leading to that city to do that very thing. Last year the Chamber furnished split log drags to two or more reliable farmers who entered into an agreement to use the drag according to directions over so much road. Both parties to the agreement kept the contract, and the result has proven so satisfactory during the past winter, the chamber is enlarging its work. Several more drags have been ordered made and several more farmers living on the good roads are going to take the chamber's proposition and keep so many miles of road well dragged after every rain. Herein is a hint that is worthy the consideration of all sections of Virginia where good roads have been built.

To Test Military Value of Lincoln Highway.

The military value of the Lincoln highway will be tested out this summer by an automobile expedition from the Northwestern Military and Naval acdemy at Lake Geneva. According to present plans 10 automobiles are to constitute the expedition including two wireless equipped machines, one field kitchen, one ambulance and field hospital combined, one officers' reconoissance car, one car for transportation of light artillery, one armored car, two balloon destroyers and one engineer's car.

The cars are to be driven and are to convey only students of the military institution named, and officers of the United States army. It is the present plan to leave Chicago in the latter part of June or the early part of July.

Road Progress Being Made.

Six states, namely, Illinois, Kentucky, Massachusetts, New Jersey, New York and Wisconsin, now have civil service laws providing for appointment of highway engineers and employes in accordance with the merit system. A description of the system in effect in each of the six states appears in the Good Roads Year Book just issued by the American Highway Association at Washington. The summary of automobile legislation in all the states is of timely interest in view of the fact that nearly 1,900,000 automobiles were registered in the United States during 1914, for which more than $12,000,000 in license fees was paid.

A majority of the states are now trying out the plan of working convicts on public roads. In some states the honor system prevails and guards are partially or wholly dispensed with. In other states guards are deemed essential, and between the two systems much controversy rages. The Year Book, with its complete digest of convict labor laws for all the states, and its many references throw much light on the subject. That convict labor will go far toward solving the road problem is demonstrated by the experience of Georgia with its army of nearly 6,000 road convicts and Virginia with about 1,500. The progress reports from these two states appearing in the chapter devoted to highway progress show remarkable gains in mileage of improved roads.

The American Highway Association finds the Year Book one of its most effective mediums for carrying on the campaign for efficient and adequate improvement in the construction, maintenance and administration of the public roads.

Cabell county, W. Va., will vote some time in May on a bond issue of $600,000 for building a system of roads.

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On May 29 Calloway county, Ky., will vote on a $200,000 road bond issue.

Lowndes county, Miss., has let contracts for 22 miles of macadam road.

Fort Worth, Tex., has contracted for street work amounting to $35,000 to connect the city streets with Tarrant county's fine roads.

The hustling city of Greensboro, N. C., has been asking for bids on 75,000 square yards of pavement, asphalt, concrete and other standard kinds of pavement.

Lancaster, S. C., has let contracts for 12,000 square yards of paving.

Tampa, Fla., will build 50,000 linear feet of concrete sidewalk.

Tuscaloosa county, Ala., has available for road work $100,000.

Wayne county, W. Va., will build three miles of brick roads.

Improvement district No. 1 of Miller county, Ark., will construct 60 miles of road.

Rockcastle county, Ky., has voted $100,000 of bonds for road construction.

Lamar county, Ala., has voted $150,000 of bonds for roads.

Big Creek Magisterial District of McDowell county, W. Va., has voted $165,000 of bonds for roads.

Precinct No. 1 of Karnes county, Tex., has voted $75,000 of bonds for good roads.

Caldwell, Tex., will grade and surface with gravel its principal streets. $12,000 available for the work.

Ennis, Tex., will spend $30,000 in street paving.

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The Dixie Highway

By HAL F. WILTSE

Secretary Chamber of Commerce, Chattanooga, Tenn.

THE Dixie Highway, eventually to be a connected road of permanent character from Chicago, Ill., to Miami, Fla., was launched at Chattanooga, Tenn., the halfway point, April 3. The occasion proved to be one of the largest and most successful good roads meetings ever held in the United States, and undoubtedly occupies leading place among those which have been held in the south. Several thousand delegates attended. Each of the six states which from the first have been identified with the movement, was officially represented by its governor or some man designated by him. In addition, Ohio's lieutenant governor attended and the governor of Alabama was represented.

Preliminary to the open meeting the governors held three conferences, as a result of which a resolution was presented to the convention for the purpose of authorizing permanent organization of the Dixie Highway Association, and designating manner of selection of a body of men to decide on the official route. The resolution was adopted, and the governors of Ohio, Illinois, Indiana, Kentucky, Tennessee, Georgia and Florida were authorized to appoint two men from each of those states these fourteen men to have full authority in selecting the route.

By April 12 ten of the fourteen had been selected. Governor Slaton, of Georgia, promptly named Clark Howell, editor of the Atlanta Constitution, and W. T. Anderson, editor of the Macon Telegraph, to act on behalf of the Cracker state. Governor Ralston, of Indiana, named Carl G. Fisher and Thomas Taggart to represented that state. Governor McCreary, Kentucky, named Harry B. Hanger, of Richmond, Ky., and Claude Mercer, of Breckenridge, Ky., Governor Rye, Tennessee, selected Judge M. M. Allison, president of the Chattanooga Chamber of Commerce, and Col. A. M. Shook, of Nashville, as Tennessee's members of the commission.

Governor Willis, of Ohio, named Harry L. Gordon and George Harris, both of Cincinnati.

The April 3 meeting, in proportions and enthusiasm, beyond question exceeded the anticipations even of the Chattanooga Automobile Club, which took hold of the project so instantly and heartily pursuant to the suggestion a few months ago, and which deserves full credit for success of the meeting, as well as the wave of enthusiasm aroused in all seven of the interested states, preliminary to the convention. Certainly the people of Chattanooga as a whole were surprised at the proportions of this great good roads meeting, although in Chattanooga more than any other city the press devoted a tremendous amount of space to the arrangements and plans. Hotel Patten, headquarters of the automobile club for weeks prior to the meeting and during the convention, presented crowded busy scenes which recalled the days of 1912 when only a few months apart, the United Confederate Veterans and Grand Army of the Republic held their annual conventions in Chattanooga.

Aside from the governors, the people widely known in public life or for their identity with good roads work, in attendance at the convention, included: Gen. Coleman duPont, of Delaware; President P. W. Meldrim, of the American Bar Association; A. G. Batchelder, chairman of the executive board of the American Automobile Association; Clark Howell, editor Atlanta Constitution; W. T. Anderson, editor Macon Telegraph; ex-Governor Hooper, of Tennessee; A. R. Pardington, vice president Lincoln Highway Association; W. S. Gilbreth, secretary Hoosier Motor Club of Indianapolis.

Adolph S. Ochs, publisher the New York Times, expected to attend but could not, and instead telegraphed his greetings and best wishes, as well as advance copy of a lengthy and very inspiring editorial which appeared in the New York Times the following morning. President Woodrow Wilson sent through Congressman John A. Moon, of Chattanooga, the following telegram:

May I not through you convey my cordial congratulations upon the inauguration at Chattanooga of the Dixie Highway, proposed to run from Chicago to Miami, Fla. Such a highway will be of greatest interest alike to the people of the east, the south and the middle west, and I shall watch its progress toward completion with the greatest interest.

WOODROW WILSON.

Various delegations, more particularly from Georgia, Tennessee and Kentucky, reached Chattanooga early—from one to three days head of time—opened headquarters, distributed literature, tacked up their maps, etc., to present and press their claims for the routing of the Dixie Highway through their respective counties or towns. Business streets of the city, the headquarters hotel and many other buildings were gaily decorated with national flags and bunting.

Before the convention settled down to the serious business of the day, the delegates and visitors enjoyed, as participants or spectators, two parades. In the first were the governors, other distinguished visitors, officers of the Chattanooga Automobile Club and other busi-

Governors and Representatives of Governors Attending Dixie Highway Convention at Chattanooga, Tenn., April 3. Left to right R. S. Keethofer, Jacksonville, Fla., representing Governor Trammel; Governor McCreary, of Kentucky; Lieutenant Governor Gordon, of Ohio; Governor Slaton, of Georgia; C. E. James, Chattanooga, President Dixie Highway Association; Governor Ralston, of Indiana; Governor Rye, of Tennessee

ness organizations of the city. After this parade was over, the governors occupied a reviewing stand and reviewed the Eleventh United States Cavalry, stationed at Fort Oglethorpe on the edge of Chickamauga Park near Chattanooga. The parades were much enjoyed, the streets being packed with Chattanoogans and people from all over the south.

At the morning session of the convention Hon. Bancroft Murray, member of the Chattanooga Automobile Club, acted as temporary chairman, being introduced by President W. R. Long, of the club, who formally opened the session. Judge Murray was succeeded by Hon. T. R. Preston, also of the club, and president of the Hamilton National Park, who acted as permanent chairman. After addresses of welcome by Governor Rye on behalf of Tennessee and Mayor Thompson on behalf of Chattanooga, the convention listened to spokesmen for the different possible routes represented in the assemblage. While the highway will pass through seven states, the really warm contests are between rival routes traversing Kentucky, Tennessee and Georgia.

The following resolution relative to permanent organization, selection of the route, etc., was adopted:

"Whereas, An association of individuals have organized the Dixie Highway assoeiation for the purpose of constructing a permanent highway from a point on the Lincoln highway near Chicago, Ill., via Chattanooga, Tenn., to Miami, Fla., and

"Whereas, the founders of this association have subscribed a sufficient sum of money to defray the expense of a permanent organization, secure surveys, maps, plans, etc., and

"Whereas, Said association has already expended considerable sums for this purpose, and has secured much data and many surveys, but has not yet sufficient data to finally determine the location of said highway at this time.

"Therefore be it resolved, by this convention of representatives from the states of Ohio, Indiana, Illinois, Kentucky, Tennessee, Georgia and Florida, known as the 'governors' convention,' that we hereby heartily approve and indorse the action of the Dixie Highway Association, in the movement to build the said Dixie Highway, and we hereby pledge to said Dixie Highway Association our most hearty co-operation and active support in pushing said enterprise to final completion.

"Therefore, be it further resolved, That the govern-

ors of the states of Ohio, Indiana, Illinois, Kentucky, Tennessee, Georgia and Florida, be, and that they are hereby requested each to appoint two impartial representatives from their respective states as directors of the said Dixie Highway Association, who, with the seven incorporators of the association, shall constitute its board of directors. The fourteen directors appointed by the governors as above provided to have full power to hear and determine all questions as to the location of the said highway and to locate the same.

"It is distinctly understood that the right of said directors to designate any particular road in any state through which said highway may run as a part of the Dixie Highway shall not in any way confer upon said directors any authority in conflict with the duly constituted road authorities in the respective states through which said highway may run."

In this connection it was announced for the first time that twenty men had been found who are willing to donate $1,000 a year for five years toward the expense of the Dixie Highway permanent organization. This list, it is anticipated, will be increased to fifty, which would mean $50,000 per year or $250,000 for the five year period. Parenthetically, it may be said the efforts of Richard Hardy, of Chattanooga were primarily responsible for laying this good financial foundation so early. In this he was ably seconded by C. E. James, Chattanooga, who has been termed by Editor Howell, of the Atlanta Constitution, the master builder of the south. Mr. James also deserves much of the credit for shaping the permanent organization in tangible form for consideration by the governors.

To facilitate the work of organization, seven men had applied for a charter under the laws of Tennessee, prior to the meeting. These original incorporators are also founders, but it will be noted from the resolution that the founders have no voice in selecting the route, except such of them as might be named by the governors of the seven states.

Governor Ralston and other speakers emphasiezd that the Dixie Highway should be the recipient of federal aid. As a result of this feeling in the convention, the following resolution, introduced by James D. Richardson, of Murfreesboro, Tenn., was unanimously adopted:

"Whereas, the establishment of the "Dixie Highway" will prove of inestimable benefit to the government of the United States, be it

"Resolved, by the conference of the governors of the states of Illinois, Indiana, Ohio, Kentucky, Tennessee, Georgia and Florida, held this day in Chattanooga, Tenn., that the congress of the United States be, and it

Eleventh United States Cavalry on Broad Street, Chattanooga, as they appeared in parade, celebrating Dixie Highway Convention and Conference of Governors at Chattanooga, April 3.

is hereby requested, to furnish financial aid in the establishment and maintenance of the proposed Dixie Highway leading from Chicago, Ill., to Miami, Fla., and be it further

"Resolved, That a committee of seven be appointed by the chairmen of this conference to present this resolution to the congress."

Subsequently, Chairman Preston appointed the following committee to present the resolution to congress: James D. Richardson, Murfreesboro, Tenn.; ex-United States Senator James B. Frazier, Chattanooga; B. A. Kealhofer, secretary Jacksonville Chamber of Commerce; Edward L. Quarles, Lexington, Ky.; Peter Lee Atherton, Louisville, Ky.; Judge Mose Wright, Rome, Ga.; W. T. Anderson, editor Macon, Ga., Telegraph.

Peter Lee Atherton, of Louisville, advocated getting United States Government engineers to co-operate with the highway commission in selecting the route. The convention concurred in this suggestion and adopted the following resolution:

"Be it resolved, That it is the sense of this meeting that the commission to be appointed by the seven governors to locate the route for the Dixie Highway be asked to request the director of the office, of public roads, at Washington, L. W. Page, to detail three highway engineers from his department to advise with and assist the governors in locating said highway."

A very eventful day closed with the scheduled banquet, at which about 400 people, about evenly divided between Chattanoogans and visitors, sat down. Hon. H. Clay Evans, of that city, former ambassador to London, was toastmaster. The governors and other prominent visitors responded to toasts. An unique and effective feature of the banquet setting was a large map of the territory through which the Dixie Highway will pass. The various proposed routes, important cities and towns, were indicated by small electric lights. As each speaker rose, the state or route that he represented was lighted on the map, the rest being dark. At Chattanooga on this map was a device emphasizing her location as hub of the Dixie Highway, and, as well, symbolical of her slogan "Dynamo of Dixie." When current was turned into this mechanism, the audience was treated to the flash and crackle of the hub-dynamo, typical of the energy exerted by the Chattanooga Automobile Club in getting up the meeting.

The Dixie Highway Meeting at Chattanooga.

By Staff Correspondent, Atlanta Journal.

Federal aid for highway construction was a note sounded with ringing emphasis by the great Dixie highway conference at Chattanooga Saturday (April 3) and if the sentiment voiced by the states represented at that conference is an indication of the sentiment in other states, it will not be long before the national government, in response to an imperative public demand, will undertake the building and maintenance of a far-flung system of roads in the same way it has for years improved the rivers and harbors of the vaions states.

The conference was a wonderful demonstration of the interest people everywhere are taking in good roads. Expecting about 2,000 delegates, the promoters of the conference awoke Saturday morning to find 5,000 enthusiastic good roads advocates camped in Chattanooga. They had come all the way from Chicago on the north to Miami on the south, and their spirit of intense interest coupled with the determined rivalry of the various contesting delegations furnished an abundant guarantee of the success of the highway project.

Conspicuous among them was Atlanta's delegation more than 100 strong representing the Fulton county government, the Atlanta city government, and all of the civic bodies of the community. The Atlanta delegation went to the conference prepared to offer whatever inducements would be necessary to bring the highway through this city. They found upon arrival in Chattanooga that Atlanta was a fixed point on the route, that every survey made and every route proposed came to a focus upon Atlanta, and that no other city was contesting Atlanta's claim to the highway.

Atlantians Applauded.

Consequently the members of the Atlanta delegation were on easy street so far as a contest was concerned and they had nothing to do but advertise their city in the customary style with banners, folders, songs and Atlanta cheers. They had the pick position in the parade Saturday, morning and were cheered and applauded vociferously. In the auditorium where the conference was held they very promptly took charge of the informal preliminaries when they marched into the hall and made a big hit with their songs and funny stunts.

The fixed points on the Dixie highway—i. e., the points over which, there are no contests—are as follows:

First, Chicago, which is the beginning point; then, coming south, Indianapolis, Chattanooga, Atlanta, Macon and Jacksonville; and, last, Miami, which is the terminus of the highway.

Between these points various routes have been surveyed at the instance of the promoters of the Dixie highway project.

From Chicago to Indianapolis the survey takes one route and this route is not contested.

From Indianapolis a route has been surveyed by way of Cincinnati and Lexington, Ky., to Chattanooga, and another route has been surveyed by way of Louisville, Ky., and Nashville, Tenn., to Chattanooga.

The cities of Cincinnati and Lexington, supported by towns along their route, are making a very strong bid for the highway to come their way, and they are being opposed by the cities of Louisville and Nashville, which have the support of towns along their route and which are bidding against Cincinnati and Lexington.

Rome's Surveyed.

From Chattanooga to Atlanta a route has been surveyed by way of Rome and another route has been surveyed by way of Dalton straight down the Western and Atlantic railroad. The Rome route goes through Chickamauga Park and down the line of the Central of Georgia railway through a lovely valley, touching Lafayette, Summerville and Rome and then east to the Western and Atlantic railroad at Kingston, from which point it follows the alternate route into Atlanta. The Dalton route, which has been named the battlefield route follows the general line of the march of Sherman's army as it fought down the Western and Atlantic railroad opposed by Johnston's army.

The city of Rome is greatly enthused over the highway and sent to the Chattanooga conference a delegation of more than 800 citizens headed by Judge Mose Wright.

Equally enthused is the city of Dalton, which also sent to the conference a strong delegation which vied with Rome in extolling the attractions of the battlefield route.

From Atlanta to Jacksonville three routes are proposed. One goes to Americus and Albany along the round-the-state highway established by the Atlanta Journal and made famous by the last Glidden tour.

The third route lies further east, by way of Hawkinsville, Fitzgerald, Waycross and Folkston.

Between these three proposed routes there is the keenest kind of rivalry. The counties along each of them already have many good roads and are prepared to build more, and when the board named by the governors of the states along the highway comes to locate the highway south of Atlanta to the Florida line, they will be in no doubt as to a good road over any route they select.

Savannah, which was not included in any of the surveys, showed her interest in the highway by sending a delegation to Chattanooga headed by General P. W. Meldrim, a distinguished Savannah lawyer, who is president of the American bar association. Savannah will urge her many beautiful and historic points of interest, her magnificent roads through Chatham county and her hotel facilities and all-round accommodations for the tourist, as reasons why the highway should be turned out of its course to take her in.

The location of the route is to be determined by a board of fourteen composed of two directors appointed by the governor of each of the seven states traversed by the highway, these seven states being Illinois, Indiana, Ohio, Kentucky, Tennessee, Georgia and Florida.

Governor Slaton, immediately after the conference agreed upon this plan, announced his appointment of Clark Howell, editor of the Atlanta Constitution, and W. T. Anderson, editor of the Macon Telegraph, to represent Georgia on the board. The other governors will announce their appointees later, and the board will meet at its earliest convenience to go over all the data concerning various proposed routes and from this data make a selection.

Dixie Highway Directors.

The directors of the Dixie Highway Association, which proposes to establish a highway from Chicago to Miami, Fla., have been named as follows:

Florida—G. W. Saxon of Tallahassee and S. A. Belcher of Miami.

Georgia—W. T. Anderson of Macon and Clark Howell of Atlanta.

Illinois—W. W. Marr of Springfield and Richard J. Finnegan of Chicago.

Indiana—Thomas Taggart and Carl G. Fisher of Indianapolis.

Kentucky—Harry Hanger of Richmond and Claude Mercer of Hardinsburg.

Ohio—Harry Gordon, lieutenant-governor, and Geo. G. Harris of Cincinnati.

Tennessee—Judge M. M. Allison of Chattanooga and A. M. Shook of Nashville.

The Chattanooga incorporators are C. E. James, president of the association; W. R. Long, secretary; Richard Hardy, C. H. Huston, John A. Patten, Morris E. Temple and T. R. Preston.

The Supreme Court of North Carolina has declared the Davidson county road bond issue constitutional and the road commission is getting ready for business. They have issued bonds for $300,000. The bonds sold easily, bringing a big premium. Mr. R. T. Brown, of Chapel Hill, N. C., has been elected county highway engineer and Mr. John C. Hicks, of Lexington, a well-known civil engineer, assistant highway engineer.

Beaverdam township, of Haywood county, N. C., voted bonds for $50,000 for roads last month.

Bradley Lane in Chevy Chase, Md. Old Macadam Treated With Oil

The North Carolina Highway Commission

By MISS H. M. BERRY

SINCE the organization of the North Carolina Good Roads Association in 1902, it has agitated constantly for the establishment of a State Highway Commission to assist counties and townships in connection with their road work. At each convention held by this association resolutions have been passed favoring the establishment of such a commission and an appropriation of sufficient funds to enable it to give the counties and townships the advice and the engineering skill needed to expend their road funds to the very best advantage to themselves and to the state generally.

Realizing the present general financial stress due to unsettled condition abroad, it was decided to ask the legislature of 1915 to appropriate only $30,000 annually for this work, although a much larger sum is needed to meet immediate demands from counties and townships. The legislature, however, felt that this was more than could be appropriated at this time and the commission was established with the very small appropriation of $10,000 a year. When it is realized that the counties and townships are expending through bond issues and special taxes to the amount of two and one-half million dollars annually and that their road officials are eager in most instances for skilled advice and assistance and want to spend this public fund to the very best advantage, it does seem as though the state should make every effort possible to meet this urgent demand and thus encourage the counties and townships in their efforts to secure systems of improved roads through the assistance of skilled and experienced road builders, insuring the best possible expenditure of these road funds.

The highway commission consists of the governor, three citizens of the state of North Carolina appointed by the governor, one from the eastern, one from the central and one from the western portion of the state, one of whom shall be a member of the minority political party, the state geologist, a professor of civil engineering of the University of North Carolina, and a professor of the North Carolina College of Agriculture and Mechanic Arts, said professors to be designated by the governor.

The governor has selected this commission and it now consists of the following:

Governor Locke Craig, Chairman.
Joseph Hyde Pratt, State Geologist, Secretary.
Professor W. C. Riddick, of the A. & M. College.
Professor T. F. Hickerson, of the University of North Carolina.
Mr. Benehan Cameron, of Durham county.
Mr. Guy V. Roberts, of Madison county.
Mr. E. C. Duncan, of Carteret county.

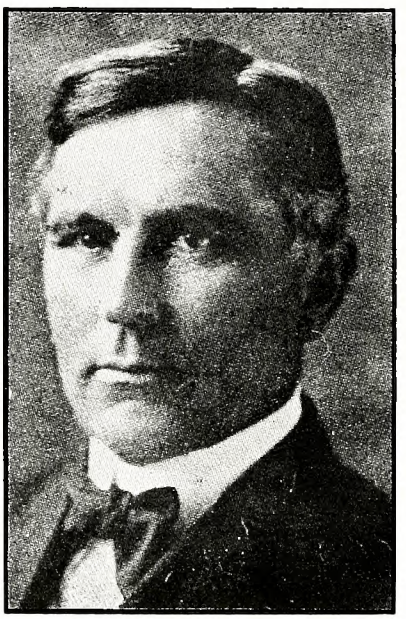
The commission organized on March the thirty-first and elected Mr. W. S. Fallis as State Highway Engineer.

It will be of interest to the people of the state to know something of the personnel of this important Commission. Below is given a brief sketch of its members.

* * *

GOVERNOR LOCKE CRAIG.

Locke Craig, Governor of North Carolina, ex-officio chairman of the State Highway Commission, was born in Bertie county, August 16, 1860. He was graduated with honor from the University of North Carolina in 1880 and after completing his law course at the same institution, located at Asheville in 1883 for the practice of his profession. In 1892 he was the democratic elector for the (then) Ninth Congressional District, and in 1896 was named Elector at large. In 1898, while canvassing in the eastern part of the state, he was nominated by the democrats of Buncombe county for the legislature and was elected by a majority of seven hundred. This was the General Assembly which proposed to the people of the state the suffrage amendment to the constitution, and Mr. Craig was recognized as one of the most influential and fearless leaders in the advocacy of this measure.



GOVERNOR LOCKE CRAIG

In 1900 he was re-elected to the legislature by an increased majority in a campaign which will be long remembered by the mountain people as the fiercest and most exciting ever conducted in that section.

In 1903 Mr. Craig became a candidate for United States senator, in which contest he made a most creditable showing.

In 1912 he became Governor of North Carolina and in his campaign speeches he stressed the urgent necessity of building and maintaining good roads. Governor Craig realized the great need of the state in this direction and, through the magic of his oratory, undoubtedly advanced the good roads cause in the many sections where he addressed large numbers of people.

During his administration he has stood for better methods of road building and maintenance and on Sept. 23rd, 1913, he proclaimed November fifth and sixth, 1913, as Good Roads Days throughout North Carolina. The net result of these days of work was not only the improvement of many miles of public road, but the creation of a sentiment for systems of improved roads and the awakening of a public spirit which is undoubtedly bearing fruit in a stronger and more conscious patriotism.

The establishment of a State Highway Commission

by the legislature of 1915 will undoubtedly stand out as one of the most far-reaching achievements of Governor Craig's administration and will mark him as our pioneer Good Roads Governor.

* * *

JOSEPH HYDE PRATT.

Joseph Hyde Pratt, State Geologist and Engineer of North Carolina and Secretary of the State Highway Commission, was born at Hartford, Conn., February 3, 1870. His father, James C. Pratt, was a southern planter and lived in Louisiana before the Civil War, serving as a captain in the 8th Louisiana regiment in the Confederate Army. Mr. Pratt was graduated from the Sheffield Scientific School of Yale University in

DR. JOSEPH HYDE PRATT
State Geologist of North Carolina

1893 as Bachelor of Philosophy, and took the degree of Doctor of Philosophy in 1896. He was instructor in Mineralogy in Yale University from 1895-97; instructor in Harvard Summer School in 1895; was lecturer in Mineralogy in the University of North Carolina 1897-1904; Professor of Economic Geology in the University of North Carolina since 1904; was Assistant Field Geologist of the U. S. Geological Survey 1899-1907; Chief of the Department of Mines and Metallurgy of the Jamestown Exposition in 1907; member of the International Jury of Awards of the St. Louis Exposition in 1905; Director of the Briquetting experiments of the U. S. Coal Testing Plant at St. Louis 1904-1905; Special Expert of the Twelfth U. S. Census on certain minerals; and has been State Geologist of North Carolina since 1906. Mr. Pratt was president of the American Peat Society 1907-9, and of the Southern Appalachian Good Roads Association 1909 to date; secretary of the North Carolina Drainage Association 1908-1911 (President 1911-1913); Secretary of the North Carolina Fisheries Association 1911 to date; Secretary of the North Carolina Good Roads Association 1908 to date; secretary of the American association of State Highway Officials 1914; President of the National Association of Shell Fish Commissioners 1912-1913, and since then a member of the executive committee; Director of the American Association for Highway Improvement; of the National Drainage Association; a Fellow of Geological Society of America, and American Association for the Advancement of Science; member of American Chemical Society, National Geographic Society; member of American Institute of Mining Engineers, Mining and Metallurgical Society of America, Sigma XI, New York Academy of Sciences, North Carolina Academy of Science, American Forestry Association, American Fisheries Society; honorary member of the Appalachian Engineering Society. He is Lieutenant-Colonel of the North Carolina National Guards (Engineering Department.)

Dr. Pratt has lived continuously in North Carolina since 1892 when he was first employed by the North Carolina Geological Survey in assisting Prof. S. L. Penfield of Yale University in collecting minerals for the state exhibit at the Chicago World's Fair. In his work as State Mineralogist and later as State Geologist he has visited every county and almost every township in the state and has a practical knowledge of their resources and needs. There is, therefore, perhaps no man in North Carolina so well acquainted with the natural resources of the state as Dr. Pratt. The fishery work of the coast, the drainage of the Coastal Plain and Piedmont sections, the geological and mineralogical work of the whole state, the study of forestry and the vigorous campaign for improved road work in every county of the state have connected him directly with many of the problems which the state is now facing. His untiring efforts in behalf of highway improvement through his work as State Geologist, as secretary of the North Carolina Good Roads Association, and as president of the Southern Appalachian Good Roads Association have brought about an enthusiasm and desire for good roads which is felt not only from one end of North Carolina to the other, but has reached to surrounding states, and is resulting in systems of roads which will connect not only one county with another, but one section with another, one state with another, and will eventually result in a system of great National Highways.

The wonderful impetus which has been gained during the past eight years in this road work, in the drainage of swamp lands, the conservation of forests, waterpowers, etc., have arisen from the untiring energy and boundless enthusiasm of a man with the one idea of promoting the best interests of our great commonwealth —and we are now beginning to reap the fruit of his labors.

* * *

T. F. HICKERSON.

T. F. Hickerson, Associate Professor of Civil Engineering at the University of North Carolina, son of Dr. James and Annie E. Hickerson, was born at Ronda, Wilkes county, N. C., April 30, 1882. He was graduated from the University of North Carolina in 1904, receiving the degree of A. B. In 1907 Mr. Hickerson achieved his Master of Arts degree from the University. In 1909 he received the degree of Civil Engineering at the Massachusetts Institute of Technology.

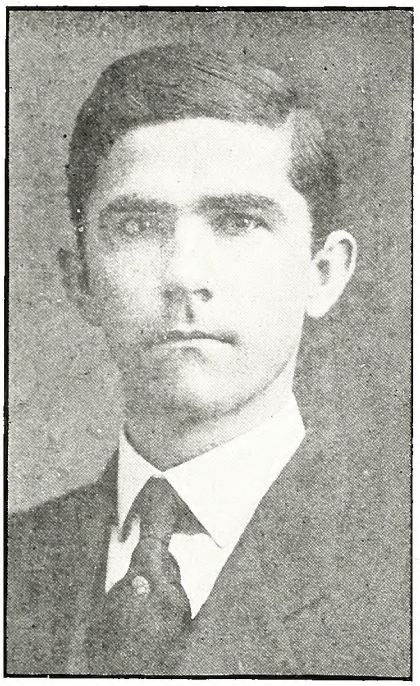
He is an Associate Member of the American Society of Civil Engineers; a Member of the Society for the Promotion of Engineering Education, and has served as an Engineer for the Highway Department of the North Carolina Geological and Economic Survey since 1910.

He was chief engineer in the survey of the Crest-of-the-Blue Ridge Highway during the summers of 1910, 1911 and 1912.

Professor Hickerson is in charge of the Course in Highway Engineering at the University of North Car-

olina and is a teacher of enthusiasm and ability.

He is editor of the pamphlets on "Formulas for Investment Calculations," and "Use of the Abney Hand Level," the latter being a publication of the North Carolina Geological and Economic Survey. He is also associate editor of Bulletin 28 on "Culverts and Small Bridges for North Carolina," published by the Survey.



PROF. T. F. HICKERSON
University of North Carolina

Mr. Hickerson is intensely interested in seeing the road work of North Carolina placed on a more systematic and scientific basis than ever before. He will undoubtedly prove a most valuable member of the State Highway Commission.

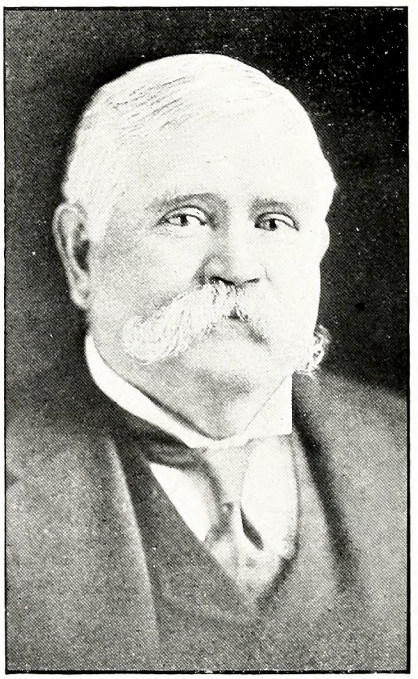
* * *

BENEHAN CAMERON.

Benehan Cameron, son of Paul Carrington and Anne (Ruffin) Cameron, was born at "Fairntosh," Stagville, (formerly Orange) Durham county, on September 9, 1854. He was educated at the Horner Military Academy, Eastman National Business College of Poughkeepsie, New York, and was graduated from the Virginia Military Institute in 1875, having been Captain of Company C. He studied law and was admitted to the bar in 1877, but has never practiced, as it became necessary for him to give his time to the management of his large plantations.

Mr. Cameron was a Director of the Morehead Banking Company, of Durham; took an active part in organizing the First National Bank of Durham, and in the building of the Lynchburg-and-Durham railroad, the Oxford and Clarksville railroad, the Durham and Northern Railroad, and the Oxford and Dickerson branch. He was director in the Raleigh and Augusta Air Line and one of the organizers of the Seaboard Air Line Company. He was a director of the North Carolina Railroad and was president of same in 1911-1913. Director and vice-president of the Rocky Mount Mills. President of the North Carolina State Agricultural Society, 1896-1897. Vice-president of the Southern Cotton Growers Protective Association, 1904-1906. Vice-president of the Farmers National Congress, 1901-1907; president 1907-1909. Member of Royal Agricultural Society of England, 1908-1914. Captain of Orange County Guards, 1875-1876. Captain on the staffs of Governors, Vance, Jarvis and Scales, and Colonel on the staffs of Governors Fowle, Holt and Carr. He represented North Carolina on the staff of General Phil Sheridan at the centennial celebration of the adoption of the Federal Constitution, 1887, and on the staff of General Schofield at the centennial celebration of the inauguration of President George Washington, 1889. President of the Scottish Society of America. Assistant Treasurer of the North Carolina Society of the Cincinnati. Vice-president of the North Carolina Sons of the Revolution. Chairman of the Committee on the Co-operation of Patriotic Organizations under the American Committee for the Celebration of the Century of Peace among English-speaking Peoples, under the Treaty of Ghent.

Mr. Cameron has always taken a great interest in the good roads movement in the state as well as nation and has been very active in promoting the cause in every way possible. He was one of the organizers and is a director of the Quebec-Miami Highway. He was one of the organizers and is vice-president of the Southern



COL. BENEHAN CAMERON
Stagville, N. C.

National Highway; a director of the American Automobile Association, and is vice-president of the North Carolina Good Roads Association North Carolina Division of the National Highways Association. He represented the county of Durham in the legislature of 1915 and introduced and worked for the establishment of a State Highway Commission.

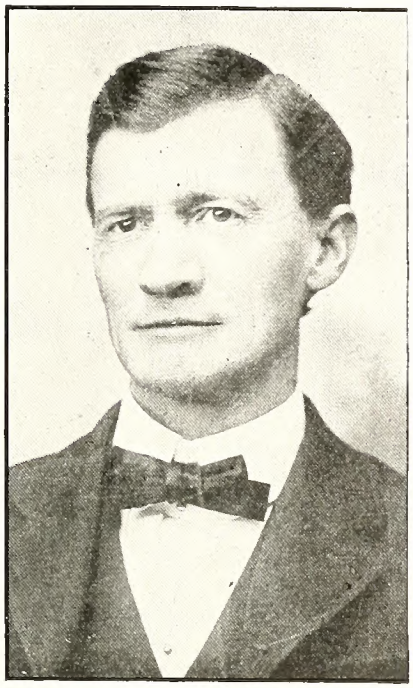
* * *

W. C. RIDDICK.

W. C. Riddick, Professor of Engineering in the North Carolina College of Agriculture and Mechanic Arts, was born in Wake county in 1864. He was educated at Wake Forest College, the University of North Carolina and at Lehigh University in Pennsylvania, from which latter institution he received the degree of civil engineer. After graduation from Lehigh, he practiced

engineering for two years and was then elected to his present position as Professor of Civil Engineering in the North Carolina College of Agriculture and Mechanic Arts. He usually spends his vacations in practical engineering work.

Professor Riddick has been connected with the North Carolina Good Roads Associated since its organization



PROF. W. C. RIDDICK
N. C. A. & M. College

in 1902, and during the greater part of this time has served as a member of the Executive Committee of this organization. He is very much interested in the promotion of good roads in the state and will undoubtedly contribute much to the success of the State Highway Commission.

* * *

GUY V. ROBERTS.

Guy V. Roberts, member of the State Highway Commission, was born at Marshall, Madison county, North Carolina, on May 26, 1876. He was educated first at Mars Hill College, from which he won a scholarship medal which carried with it free tuition at the University. After four years in the University he graduated in 1902. During his sophomore year he won the declaimer's medal; was one of the debaters during his junior year, and a member of the 'Varsity football team. He studied law while at the University and received his license in August, 1902. He formed a law partnership with W. W. Zachary and has practiced law at Marshall up to the present time.

Mr. Roberts was a delegate from the Ninth North Carolina Congressional District to the National Democratic Convention of 1912. He is now chairman of the Democratic Executive Committee of the Nineteenth Judicial District and has represented Madison county on the Congressional Executive Committee for ten years, having served four years on the State Democratic Executive Committee.

In 1913 he was appointed record examiner for the Federal Government under the Civil Service, but was unable to accept the position.

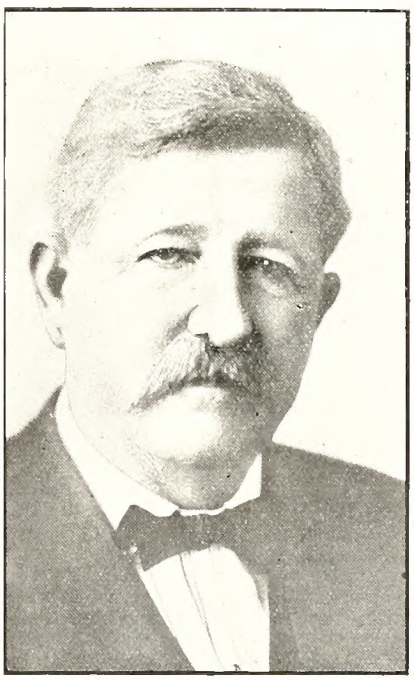
Mr. Roberts is interested in roads work and for the past two years has been a member of the Madison County Highway Commission which had the responsibility of the expenditure of a bond issue for $300,000. Having become interested in the promotion of good roads in his county, Mr. Roberts feels a keen interest in the promotion of the cause throughout the entire state.

GUY V. ROBERTS
Marshall, N. C.

* * *

E. CARL DUNCAN.

Edward Carlton Duncan, member of the North Carolina Highway Commission, representing the minority party (republican) is the son of William B. and Sarah A. Duncan and was born at Beaufort, March 28, 1862.



E. CARL DUNCAN
Beaufort, N. C.

He was collector of customs in the port of Beaufort 1890-1894. A member of the North Carolina legislature 1895, 1897. Collector of Internal Revenue 1898-1908. Republican National Executive Committeeman. Delegate at large to the Republican National Conventions, 1896, 1900, 1904, 1908, and since 1904 has been a member of the Republican National Executive Committee of North Carolina.

He was appointed receiver of the Seaboard Air Line railway. He is president of the Merchants National Bank of Raleigh and is a director of the Atlantic and North Carolina Railroad.

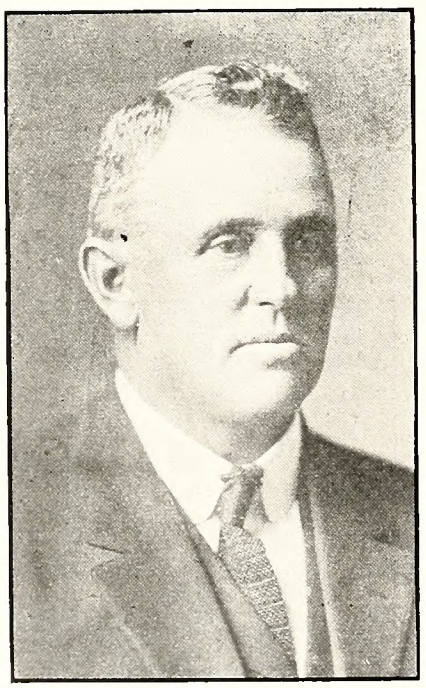
Mr. Duncan is a man of splendid business ability and public spirit, and feels a keen interest in the upbuilding of North Carolina. He realizes the great importance of the acquirement by the state and counties of good roads, and his keen business insight will be of great value to the highway commission.

* * *

W. S. FALLIS.

W. S. Fallis, State Highway Engineer of North Carolina, was born in Rockingham county, Virginia, and was educated at Pennsylvania State College, with a short course at the University of Pennsylvania.

He was employed by the American Bridge and Iron Company, of Roanoke, Virginia, during 1889-1890. From 1890-1896 he conducted a machine shop and engineering contracting business at Harrisonburg, Virginia. From 1896-1898 he was engaged in general engineering and surveying practice. In 1898 he was made engineer and superintendent of public works of the town of Harrisonburg, Virginia, and at the same time did general engineering work along municipal lines in Virginia and West Virginia.



W. S. FALLIS
State Highway Engineer

In 1907 he came to North Carolina and built the macadam roads of Wilson county. He has been engaged in road work in this state ever since.

Mr. Fallis is thoroughly familiar with all phases of road work which have been met with in North Carolina. He built the sand-clay roads of Franklin county which have gone far to establish the reputation of this type of road throughout the country. Mr. Fallis was also in charge of the road work of Iredell county in building a system of topsoil roads under a $400,000 bond issue. In Catawba county, where Newton and Hickory townships each had a bond issue of $50,000, Mr. Fallis has had charge of the work for the past three years, and in Vance county he has built a system of sand-clay roads with a $200,000 bond issue. He has done work in various portions of the state as a highway engineer of the North Carolina Geological and Economic Survey.

Mr. Fallis is a man of wide experience, of good common sense and of splendid executive ability, and it is believed that the State Highway Commission acted wisely in selecting him as State Highway Engineer of North Carolina at this important crisis in the road history of the state.

Motoring to Mt. Mitchell.

Motoring to within eight miles of the summit of Mt. Mitchell, 6711 feet above sea level, highest mountain east of the Rocky Mountains, is now one of the splendid incentives for the motorists of the country to come to the Land of the Sky in the Blue Ridge Mountains of western North Carolina.

War conditions, and the cry of hard times in other parts of the country, have not touched Asheville nor this beautiful mountain region, so full of glorious scenic surprises. The good roads spirit and enthusiasm are bubbling in every section of this beautiful mountain region and big forces of men are now at work in various parts of this mountain country building additional highways. Heretofore but one inlet was available for motorists coming to Asheville. Now there are three splendid highways leading into Asheville from the national or New York-Atlanta Highway as follows:

The highway from Charlotte to Asheville by way of Chimney Rock and Hickory Nut Gap, passing through the famous Broad River Gorge with its wonderful "Chimney Rock" guarding the southern passage between mountains of solid granite on either side, nearly 2,000 feet above the tumbling waters of the Rock Broad River and then crossing the Eastern Divide through Hickory Nut Gap, 2850 feet above sea level, over a magnificent road 24 feet wide, constructed by a squad of state convicts under the general supervision of Dr. Joseph Hyde Pratt, State Geologist of North Carolina and Second Vice President of the National Highways Association. Coming down the mountain on the north side in Buncombe county one descends into the beautiful Fairview and Swannanoa Valleys, 565 feet, by eight great swinging loops about the face of the mountain, within a distance of a half mile, as the crow flies, and thence into Asheville over a splendidly graded highway.

From Spartanburg, S. C., to Asheville, passing through Tryon, famous for its persons prominent in the literary world, and across Saluda Mountain by way of Hendersonville to Asheville.

From Greenville, S. C., across Paris Mountain by way of Flat Rock and Hendersonville and into Asheville.

From Asheville to Black Mountain is sixteen miles over the Southern National Highway, which is also the Central Highway of North Carolina, where one can leave his automobile and secure guides and mules for the last eight miles over the trail to the summit of the Monarch of the East.

Good Roads Promote Brotherhood

By HON. R. C. TERRELL

Road Commissioner of Kentucky

IT MAY be interesting to note that Kentucky was one of the first states—if not the first state—in the Union to lend aid in the construction of its public roads.

The legislature in 1810 provided for the construction, or rather for the laying out and grading, of a road by two routes to the Virginia line, roads over which the emigrants from the East and the Southeast wended their ways across the mineral wealth of the mountains to the fertile fields of the Bluegrass, and thence westward to the land of the "Pennyrile" and the "Purchase." Prior to 1837 Kentucky had spent several million dollars in the construction of roads, most of them being macadam roads built under the direction of French engineers, who were employed by the State of Kentucky at salaries which at that time were extremely large for public officials, the chief engineer receiving $5,000 annually, with two assistants at $3,000 each per year; one at a salary of $1,600, five at a salary of $1,500 each per annum, and 4 assistants at a salary of $1,100 each per annum. These engineers, or at least the chief engineer, fresh from the Napoleon operations in road building, and with the idea that work worth doing was worth doing well, constructed very high types of road. Only recently the writer had the pleasure of going over 150 miles of roads built in those early days, which were constructed on wide rights of way, in most instances being 60 to 100 feet in width, and the roadbed paved with Telford foundation 16 feet wide and 20 to 24 feet between ditches, with splendid drainage provided for, easy grades and easy curves, with permanent stone arch culverts and bridges.

When we consider the fact that this work was done by pick and shovel, and with the ox cart to move and make the heavy fills and cuts, which were necessary to maintain the grades, it makes one marvel at the foresight and permanency with which this early work was done as compared with the slipshod and temporary methods that have been employed by the various counties in recent years in road building through the Commonwealth. This work, however, was discontinued after the abandonment of the policy of internal improvement, and the depleted condition of the treasury caused by the Civil war made it almost impossible for the state to participate in this class of work. With the advent of the railroads it was thought that the question of transportation was entirely solved, that roads were no longer a public necessity; or at least through routes or connected roads were of little importance, as all roads that were expected to be of much importance were those from the farm to the station. These roads, of course, were very important, but there is a stronger demand for a more complete system of united highways now than ever before.

The many wildcat schemes and the floating of bonds by the counties to secure railroads, which were never built, frequently cost the county large sums of money. Hence, in 1818, when the new Constitution of Kentucky was adopted, its framers prohibited the counties from selling bonds for any purpose in excess of two per cent. of the total wealth of the county, and then requiring a two-thirds vote of the people to permit the sale of such bonds, and refused to permit the state to participate in road building or lend lend its credit or financial aid to the counties for that purpose.

In 1908 the General Assembly adopted a constitutional amendment, which was ratified by the votes of the people in 1909, permitting the state to lend its credit or financial assistance to the improvement of the public roads, and to permit the counties to increase their bonded indebtedness from two to five per cent. of the taxable wealth of the counties for public road purposes.

In 1910 bills were introduced into the General Assembly to put into operation the new amendment to the Constitution, which were defeated. At the General Assembly in 1912 the same bills were introduced, and finally a compromise effected, taking from the automobile license tax (which had been designated as a road fund, and accruing in the treasury since 1910) an amount not to exceed $25,000 annually for the purpose of maintaining a State Department of Public Roads, the duty of which was to furnish plans, specifications and estimates of cost for all road and bridge work costing over $500.

The duties of the State Department of Public Roads also included the holding of road meetings throughout the state for the purpose of creating interest in and to assist in the building of public roads.

The General Assembly of 1914, realizing that public necessity demanded a complete and systematic method of road improvement, enacted a law levying a five-cent tax on the $100 to constitute a state road fund, and adding to that tax the license tax on automobiles, to be used in the improvement of the public highways of the state; this money to be distributed to the various counties applying for state aid in proportion to the amount of money spent by the various counties for road building, and no county to receive more than 2% of the total fund in any 1 year, provided that the county raised and spent under the direction of the department an amount equal to that asked for from the state; or, in other words, the state paying half and the county half the cost of all road construction in which the state participates, also designating a system of public roads which connects each county seat with the county seat of the adjoining county, and the county seats of the border counties with the state line. Such a network of roads, when completed, will bond together the inhabitants of the state as they never have been united before.

The beautiful motto, "United We Stand," contained in the seal of our great commonwealth, is fittingly emblematic of that union which will come to our people from the complete system of public highways. Our social environment and intercourse, our educational standing, our religious and moral welfare, will receive an impetus such as has never been felt in this Commonwealth before and the rural population will enjoy the comforts of life, health, wealth and prosperity as they are now enjoyed by the urban population, and their happiness will be complete.

Richland county, S. C., has legislative sanction to issue bonds for $1,250,000 for building a system of good roads.

Hamilton county, Tenn., will issue additional road bonds for $25,000.

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Official Organ Southern Appalachian Good Roads Association
DR. JOSEPH HYDE PRATT, President, Chapel Hill, N, C.
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Official Organ of the South Carolina Good Roads Association
F. H. HYATT, President, Columbia, S. C.
FINGAL C. BLACK, Secretary, Columbia, S. C.

VOL. XI. MAY, 1915. No. 5.

THE DIXIE HIGHWAY.

When a handful of Chattanoogans started the movement for what is now known as the Dixie Highway a few weeks ago they little thought that the enterprise would meet with such instant favor or that it would arouse such a perfect whirlwind of enthusiasm.

The Atlanta Constitution calls it a "good roads revival." Other leading newspapers refer to it in much the same way and recall the agitation of several years ago when the Natinal Highway and other highway projects were launched. The Dixie Highway campaign, however, promises to eclipse even those stirring battles and all along the line, from Miami to Chicago, the people are getting busy.

The highway is to be built from Chicago to Indianapolis and from that city on there is to be a series of battles that will make the old-time road fights look exceedingly tame. Mr. Thomas Taggart, well-known democratic leader in Indiana, has been appointed a member of the Dixie Highway Commission by Governor Ralston. His personal and political enemies are charging that it is his purpose to locate the highway for the benefit of his hotels and several other factors are entering into the controversy.

Cross the Ohio river and enter Kentucky and the fight is even warmer. No less than four routes are being urged for this important highway and one of these is the Boone Way. Louisville, Lexington and other good cities are in the fight.

In Tennessee, Chattanooga is the only fixed point at present and the state's biggest cities are all aroused.

Down in Georgia Atlanta is the only fixed point and there are several different routes proposed. A score of towns, large and small, are scrapping for a place on that highway. Of course, all of them can't win, but the fight will do good.

The Springfield Republican calls it the "Dixie Peace Highway" and suggests that the highway be made a memorial commemorating the 50th anniversary of the establishment of peace in the Union, symbolical of that accord between brethren that shall never more be broken.

The highway will follow historic lines. For instance, in Georgia it will go to Atlanta over the route that Sherman travelled in his devastating march to the sea. In Tennessee, around Chattanooga, it will cut through smiling fields and valleys, and wind about through mountains that resounded to the echo of marching hosts, deadly cannonades and desperate hand to hand fighting in the 60's. Through Chickamauga, Ringgold, Dalton, Resaca and under the shadow on Kennesaw Mountain the great road will run.

In the North the Dixie Highay will cross the Lincoln Highay, and in Tennessee it will cross the Southern National Highway, the two big highways that are to connect the Atlantic with the Pacific seaboard.

The Springfield Republican, the Cincinnati Enquirrer, the Chicago Tribune, the Louisville Courier-Journal and other great newspapers of the section to be traversed by the "Dixie Peaceway," as some have called it, are a unit in declaring that the project is one of national importance.

THE N. C. STATE HIGHWAY COMMISSION.

We take great pleasure in introducing to the readers of Southern Good Roads the members of the North Carolina State Highway Commission. Miss H. M. Berry, secretary of the North Carolina Geologic and Economic Survey, has prepared a sketch of the life and achievements of every member of the commission.

We are sorry that this commission is to be hampered in its work by lack of funds. The small appropriation of $10,000 per year will not go far but we predict that the commission will make such a showing with it that the next legislature will make the appropriation at least five times as large as the first.

The commission is composed of men of the very best type. We do not believe that in all of the state a more patriotic, a better balanced or a more progressive commission could have been found.

BOONE HIGHWAY.

We congratulate Mr. James Maret, of Mt. Vernon, Ky., and the loyal Boone Way Boosters, on the success that they have achieved. When they started the movement for the building of the Boone Way through the

mountains of Kentucky, by way of Crab Orchard, Mt. Vernon and Cumberland Gap, they were laughed at, for the project did not look reasonable.

Who cared about such a highway? Who would travel it? Where would the money come from? These and a dozen other question were asked and the Boone Way Boosters had an answer for every one of them. They kept up the fight and a few days ago there came a news dispatch from London, Ky., saying that a road bond issue of $100,000 had carried in Laurel county and that this provided for the last link in the Boone Highway.

It was fine work. We commend the example of these faithful, optimistic, enthusiastic, fighting Boone Way Boosters to good roads people everywhere.

AN EDUCATIONAL MOVEMENT.

In every part of the South efforts are being made to wake up the country people to their need of good roads. The North Carolina legislature passed an act authorizing the establishment of road patrols composed of schoolboys in every county of the state that would appropriate as much as $100 out of the county funds for the purpose.

In Oklahoma State Highway Commissioner Sidney Suggs is working for the organization of good roads and tree planting clubs in every rural school in the state. It is the plan of Col. Suggs to have the county highway engineer in every county visit every club formed in his county and lecture on the fundamental principles of road building and lay out a mile of road leading from the school, with the assistance of the members of the club, oversee its construction by members of the club and arrange for its maintenance.

That is a plan worth while and we hope to see it succeed.

Bond Issues for Roads in the South.

The following counties and cities of the South have issued bonds recently for the building of roads and streets. The figures appeared in the Manufacturers Record of April 28 and later figures have been added.

Alabama:	
Lamar county	$150,000
Florida:	
Dade county	100,000
Largo, city	11,000
Manatee county	250,000
West Palm Beach, city	100,000
Georgia:	
Macon, city	120,000
Kentucky:	
Ballard county	300,000
Knox county	200,000
Laurel county	100,000
Nicholas county	125,000
Rockcastle county	100,000
Louisiana:	
Jennings, city	75,000
St. Mary's parish	200,000
Terrebonne parish	105,000
Mississippi:	
Lafayette county	10,000
North Carolina:	
Alexander county	150,000
Chatham county	150,000
Davidson county	300,000
Haywood county	50,000
Polk county	15,000
Surry county	30,000
Swain county	100,000
Yadkin county	60,000
South Carolina:	
Anderson, city	100,000
Chester county	18,000
Greenville, city	125,000
Sumter county	10,000
Tennessee:	
Montgomery county	50,000
Texas:	
Bell county	4,000
Brazos county	4,000
Calhoun county	60,000
Caldwell, city	12,000
Ennis, city	30,000
Gregg county	300,000
Hardin county	150,000
Karnes county	75,000
Medina county	40,000
Navarro county	75,000
Sumner county	12,000
Victoria, city	30,000
Virginia:	
Fairfax county	50,000
Nelson county	30,000
West Virginia:	
McDowell county	165,000
Total	$4,141,000

Transcontinental Tours Planned.

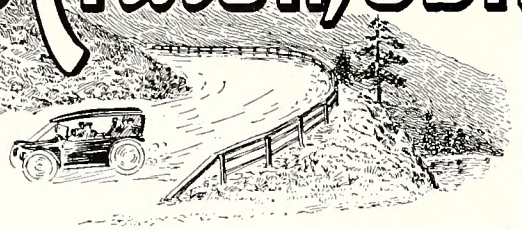
A great deal of interest has been shown in the program recently issued giving details of the proposed transcontinental tour over the Old Trails route under the auspices of several road association. Three trips are planned: the one leaving the Headquarters of National Highways Association, 18 Old Slip, New York City, June 15th over the Old Trails rotue, the program for which has already been issued; an eastern return trip leaving San Francisco about August 1st and a third western trip leaving New York about September 6th, for both of which program are now being prepared.

Applications have been received from a number of ladies and A. L. Westgard, who will personally conduct the tours and set the pace, has arranged the schedule with that in mind, setting the daily average run at a point where the fatigue of the entire journey will be at a minimum.

A persistent request by owners to be allowed to join the tours in their own cars is being carefully considered by those directing the tour and they are inclined to favor it under certain necessary restrictions.

The Lincoln highway in Crawford and Wyandotte counties, Ohio, has received special consideration from State Highway Commissioner James R. Marker. By a combined effort of the commissioners of both counties and the Lincoln highway boosters of Buckrus, and Upper Sandusky, the Lincoln highway has been made an additional state road from Bucyrus to Upper Sandusky. This section is now designated as Market Route No. 3.

The Automobile in the South



A Live Automobile Club.

There is probably no more active or enthusiastic automobile club in the country than the Chattanooga Automobile Club, although it is less than a year old. That organization undoubtedly established a record by taking hold of the Dixie Highway, so early in the club's career, and making this tremendous, far reaching project the success evidenced by the meeting at Chattanooga April 3. The club deserves and is being accorded entire credit for grasping full import of a permanent, connected highway from Chicago to Miami, and for arranging the meeting to start a tangible movement for such a highway. Members of the club traveled about a thousand miles in varying weather, over good, bad and indifferent roads, spreading the propaganda and surveying possible routes with the aid of engineers, this professional assistance being paid for by the club. Committees from the club worked out all physical details of preparation for the meeting. As gradual improvement is effected in the Dixie Highway making communication easier between the north and south, and when in future years the great artery of traffic is rendered permanent in construction, the thanks of a nation will go out to the Chattanooga Automobile Club for the intelligent and untiring efforts which put the highway machinery in motion.

* * *

One Way of Teaching Road Etiquette.

The Muskogee, Okla., Democrat tells of the lesson on the "etiquette of the road" that one Muskogee driver will never forget, which was administered recently on the road between Muskogee and Wagoner. There were two automobiles trying to get through a mud hole. Neither could make it alone. So finally a long pole was secured and the machine in the rear pushed while the one in front pulled and the front machine was finally forced up until the wheels touched hard ground and the car got out. The driver of this car had a passenger who was very anxious to get to his destination so the driver instead of waiting to help his rescuers out of their predicament called out to them to go back to a farm house and get a rope and as soon as he delivered his pasenger he would come back and pull them through.

There were three men in the stranded car. There were several times as many drinks. They decided not to wait for their friend to come back so they got a farmer with a rope and some mule power and pulled themselves out. Later they met the driver they had pushed out of trouble coming back. They signaled his car to stop. One of the three got out, silently walked up to the other car and indicated that there was something the matter with a tire. The unsuspecting driver leaned over the side of the car to take a look, when biff!—and he got a blow at the base of the car that dropped him back into the car as if he had been hit by a bullet. The person who had taken this means of teaching a little lesson in "road etiquette" walked away without a word, joined his two companions and drove away. The driver who got the biff on the car says he will never again leave if there is any chance of his helping.

* * *

According to careful estimates made by the Lincoln Highway association, about 5,000 motorists will tour to the Pacific and back over the Lincoln highway this season. This makes 10,000 transcontinental motor trips over the highway. Of the cars, 3,000 will come from east of the Ohio river, 1,000 from between the Ohio and the Missouri and 1,000 from west of the Missouri, but not from California.

The cars starting east of the Ohio will cover 6,000 miles each, totaling 18,000,000 miles. The 1,000 cars owned in the territory between the Ohio and Missouri rivers will run about 4,000 miles each in their trip, covering 4,000,000 miles, while the other 1,000 cars will each run about 2,000 miles, totaling 2,000,000 miles. This makes the total of car miles covered by these three groups of Lincoln highway travelers alone, without allowing for side trips, 24,000,000 miles.

* * *

It was announced by Secretary A. H. Hoblitzel, of the Ohio Valley Automobile Club, Wheeling, W. Va., that within a few weeks at the best, the most comprehensive and most useful road map ever issued in this section of the country will be the one prepared by the West Virginia State Automobile Association, showing every thoroughfare in the entire state. The map indicates the improved and principal roads by heavy lines, and the unimproved ones by lighter lines. It also indicates old land marks to guide the driver.

In addition to the excellent road map, the folder has much interesting and instructive information relative to all the roads and principal garages and supply houses along the various state routes. The folder is the best ever issued in West Virginia for automobilists and every one who tours the state this year should possess one of the booklets.

The map will conform with the national map issued annually by the American Automobile Association, showing which route to take in leaving the state.

* * *

Making Preparation for Touring in 1915.

American Automobile Association clubs throughout the country are making extensive preparations for what promises to be the liveliest touring season since the introduction of the self-propelled vehicle. At the two National clearing houses, in New York City and Washington, D. C., the volume of inquiries has been astounding, according to Chairman F. X. Mudd of the A. A. A. Touring Board, who predicts in 1915, a wonderful roads intermingling of the people of the several states.

Both the northwest and the southwest intend to have their share of the substantial interstate travel which will be accelerated by the Panama-Pacific Exposition, and while the Lincoln Highway will be a busy thoroughfare, it will not have a motor car monopoly.

The Automobile Club of Seattle has started a cam-

paign for the Northwest Trail, and is coupling with it a combination of the Lincoln Highway which will take the cross-country traveler from Cheyenne diagonally across Wyoming, touching and possibly entering Yellowstone Park—if roads construction now in progress is completed—and continuping across Montana, with a side trip to Glacier National park made possible by the road constructed by the Flathead Motor Club of Kalispell; then through Washington by way of the Snoqualmie Pass into Seattle.

Journeying southward over the Pacific Highway there will be opportunity to drive in Rainier National park, and in Oregon visit Crater Lake National park, besides taking a look at the famous Columbia River highway which begins at Portland. The Yosemite Valley park is now available to motor cars, and it is within easy distance of San Francisco, where the California State Automobile Association headquarters within the grounds will be prepared to help all touring motorists.

The Automobile Club of Southern California, with headquarters in Los Angeles, has given its particular attention to the National Old Trails route, which it has sign-posted all the way to Kansas City, Mo. For those who start early in the year this route will appeal, and it will also command the attention of those who return late in the fall. A percentage of these will also make the side trip to the Grand Canyon, drop down to Phoenix and then follow the route of the All-Southern National Highway across Texas, Arkansas, Tennessee, North Carolina, and Virginia to Washington, D. C.

Colorado doesn't intend to be overlooked, and the large number of road travelers which the state entertained last year has accelerated its mountain road building until much can be offered to motorists. When a Colorado delegation, headed by Governor Carlson, and former Governor Ammons recently urged Congress to act favorably on the bill to create a Rocky Mountain National park out of 360 square miles of forest reserve in that state, the keynote of the plea was "to turn back the tide of tourist travel to Europe, and direct it to the beauty spots of America." Congress acted favorably upon the request, and its action indicated the growth of sentiment towards the utilization of American scenic attractions.

Secretary of the Interior Lane in a recent interview said: "The first step in conservation taken by our people was to save scenery—not water, or coal, or forests; but scenery! That's what we did when we led the world by setting aside our great national parks—Yellowstone, Glacier, Mount Rainier, Yosemite, and the others. These we hope to make more surely pleasure places for the people by securing roads that will stand automobile traffic. Already within three days of New York the tourist can find scenery that cannot be approached anywhere in Europe."

* * *

Open Yellowstone Park for Motorists.

Two impelling attractions soon may be added to the scenic assets of the Pacific Northwest and serve to accelerate road travel in that part of the country. One of these is certain—the Columbia River Highway; the other is possible—opening of the Yellowstone wonderland to motor driven vehicles.

Samuel Hill, the well known roads enthusiast, thus informs Chairman Frank X. Mudd of the A. A. A. Touring Board as to the great thoroughfare which will begin at Portland and skirt the majestic river of the Northwest: "You may say authoritatively that the Columbia Highway will be open for travel July 1, although only hard surfaced in part. In my opinion the Columbia Highway will surpass in scenic beauty any road anywhere in the world."

The effort to secure the admission of automobiles into Yellowstone Park is not of recent origin, and President John A. Wilson of the American Automobile Association is continuing the policy of his predecessors in urging that this National recreation area should be available to the modern form of transportation. A communication to the A. A. A. head from E. P. Mathewson, president of its Montana State body, concisely summarizes the situation in these words:

"We, of Montana, have felt for some years past that the stage lines in Yellowstone Park were not progressive and were not looking to their own best interests in working against the introduction of automobiles. As a rule, the visitor to the Park nowadays takes the five-day trip. People who are not physically fit are extremely weary after a long ride in the stage coach; and many people who would otherwise visit the park will not go on account of the poor arrangements for transportation. If the good people running the stage lines would substitute the modern sight-seeing automobiles, they would have twice the number of passengers and could charge a larger fee. In addition to this, they would be able to take a much more extended route through the Park, visiting points of interest that are never seen by the ordinary visitor."

It was natural that the U. S. Senators from the Pacific Northwest would take an interest in the Yellowstone matter, and Senator James H. Brady of Idaho, and Senator F. E. Warren have been especially active. In a letter just directed to the Hon. Stephen T. Mather, assistant to the secretary of the interior, and in charge of the national parks, Senator Brady thus refers to the subject. "Conferences had with your predecessor in relation to certain improvements and changes in the park roads causes me to express the hope that it is now possible for the people en route to the Panama-Pacific Exposition to enjoy the advantage which automobile service in Yellowstone would afford. It would be a splendid thing and of much benefit to the traveling public, and I am hopeful that the 1915 interstate travelers will have opportunity of using their own vehicles in the Park."

Admission into Yellowstone will result in considerable travel over the Park-to-Park road connecting with Glacier National Park, and a use of the new Snoqualmie Pass road over the Cascades, with Seattle as the destination. Then would come the use of the Pacific Highway through regon southward to California. For those who would emerge from Yellowstone at the western gate there would be offered the Idaho route, which would include Shoshone Falls, deservedly known as the Niagara of the West, and successfully competing with the great cataract in its picturesque grandeur.

Unquestionably the western country is going to make an irresistible appeal to a large percentage of the million and three-quarters of motor car road travelers.

In Indiana in St. Joseph county, Vigo county and Marion county rapid progress is being made. St. Joseph county will this year build about twenty miles of concrete road along the route of the Lincoln highway.

Plans are being drawn for a great bridge across the Cumberland river at Hyde's Ferry, Davidson county, Tenn., near Nashville. A bond issue of $250,000 has been authorized for its construction.

GOOD ROADS NOTES
GATHERED HERE and THERE

Florida.

The following good roads items are clipped from Florida papers:

Hard surfaced roads are the best asset any county can have as an inducement for new settlers. A hard road direct from here to Old Town would be of more benefit than county division.—Mayo Free Press.

Now that Baker county has her convicts on the roads we may expect some better road building and cheaper. It would be a good idea to start at the west end of the county and work on the National highway until it is graded and placed in good shape. This is one of the most important roads in the county and should receive attention first.—Macclenny Standard.

In looking over the report of the comptroller of the state we find that quite a number of counties in the state are spending vast amounts on good roads. The amount spent may be in excess of what they should spend at the present time, but the returns will be much better and quicker. We are sorry to see some counties which have such blind commissioners that they are skimping on roads and spending elsewhere where the lasting good will not be so great.—Trenton West End.

A good sand-oil road from Jacksonville to Fort Myers would cost less than $750,000. Such a road would bring thousands of tourists to the state, especially now that they can not travel abroad, who otherwise will not come. If it only brought 1,000 persons who would leave in the state $250 each, then we will have all our money back in exactly three years. My! Everybody in the north, who could raise the price, would want to try that road once—and if once, then more.—Arcadia News.

Through the energetic work of Mayor A. W. Corbett another big convention has been landed for St. Augustine. This is the next meeting of the Florida State Good Roads Association, an organization always largely attended. According to news advices from St. Petersburg, the contest was a spirited one. When they come here next year St. Johns will be able to show them sixty-five miles or more of splendid brick highways. And St. Augustine will entertain them as only the Ancient city knows how.—St. Augustine Record.

* * *

Kansas.

Kansas will take an active hand in the fight this year to make good roads of bad ones and to promote municipal paving in the smaller towns of the state. W. S. Gearhart, state highway engineer, is now directing city and township road building in several sections of the state and a real road building campaign will be conducted this summer.

In a recent announcement from the office of the highways engineer, Kansas towns were advised that they might have free counsel in the building of better streets. Not only will Gearhart aid in the improvement of streets and roads, but he will give advice as to street paving and direct the work.

Officers in many of the small towns of free state aid in better street building details of the paving problem. They know little or nothing as to the real cost of the work, or as to the kind of material that gives the best results. Quite a number of small towns have taken up the paving campaign and Gearhart sees a busy season ahead of him.

* * *

Louisiana.

The contract for the construction of the highway from Covington, to Slidell, La., has been awarded to a Hattiesburg, Miss., contractor for $37,534. The highest bid was over $57,000. A steel bridge will be constructed across Bayou Lacombe with a draw.

The distance between Covington and Slidell will be shortened twenty-six miles by the road. The Louisiana State Highway Department will pay a part of the cost of this highway, and will put in concrete bridges wherever necessary provided the parish of St. Tammany will not ask for further state aid during the year 1916. The Good Roads Committee and the police and the police jury accepted the proposition from the state.

Contracts have been signed for the construction of 110 miles of highway in St. Tammany parish. The new Slidell Covington highway will be built under the supervision of the state engineers. It will be a model dirt highway, thirty-four feet wide from ditch to ditch.

Of the $180,000 voted last year for road purposes, there now remains nearly $50,000 of unappropriated funds on hand for road purposes exclusively.

* * *

Massachusetts.

Bills have been introduced into the Massachusetts legislature to provide that prisoners may be employed in large numbers upon the highways of the state.

Last year an amendment was passed permitting prisoners to be used by counties, cities, and towns on the roads, the same to be worked under the custody of the local sheriffs. The present bills seek to broaden the scope of this work and to place it under the supervision of the State Highway Commissioner, as recommended by the National Committee on Prisons and Prison Labor.

The people of Massachusets have heard through the committee of the success which has attended convict road work in a score of states. Information has been afforded them as to Colorado's wonderful roads, worth $2,500,000 and built by prisoners for less than $50,000; also that West Virginia is saving over 53 cents per cubic yard by having her prisoners build roads; and that Iowa is able to pay her prisoners $2.50 per day for their road work.

Massachusetts never lags behind the other states in any upward movement, and the National Committee on Prisons and Prison Labor has been assured that this year will see the legislation enacted which will bring her in line with other progressive states in the matter of convict road work.

* * *

Missouri.

Jollying the jolts out of Missouri's part of a national highway is a new role undertaken by Col. Frank W. Buffum, state highway commissioner.

"We must make the Old Trails Road through Missouri so good that travelers to the fair this year can run their cars over it without an engine—run them on

the car's reputation," he has written to a lot of men who are interested in the road.

Colonel Buffum is undertaking the heaviest mail campaign for better roads that the state ever has witnessed. Two weeks ago he wrote a letter to every man living alongside the Old Trails Road from St. Louis to Kansas City, urging the importance of getting the road in shape for the fifty thousand motorists who are expected to pass over it this summer on their way to the Pacific Coast. Now he is writing more letters to residents along the road that require the most dragging and repairing, and urging that only the most thorough work be accepted.

Every mile of the road across the state is now either hard surfaced or being kept dragged, but Colonel Buffum is urging making better roads of good roads.

"We are working out a system of gravel hauling by means of motor trucks, which will make it possible to haul gravel ten miles as cheaply as it can now be hauled three miles with horses," he writes.

* * *

Virginia.

The Virginia convict road force includes both state and county prisoners, all working under the control of State Highway Commissioner Coleman. He satisfies himself in regard to the proposed road, and furnishes estimates, plans, etc., to the county commissioners. If they then desire to undertake the work, they must first agree that it shall be done under the supervision of the highway commissioner.

Ex-Governor William H. Mann is responsible for this provision in the Virginia law, which is in line wth the recommendatons for state control of county prisoners made by E. Stagg Whitin, of the national committee on prisons and prison labor, in his address before the A. A. A. First Federal Aid Convention in Washington.

Virginia road work is carried on either under the contract or the force account system. Hon. George P. Coleman, State Highway Commissioner, condemns the contract system, contending that under the "force account" better results are obtained, both for the county and for the convict.

When the work is carried on under the force account system, the highway commissioner and the state superintendent of prisons agree as to the rules and regulations for working the convicts. The prisoners are then turned over to the highway commissioner, the superintendent only supplying the guards, who are subject to the approval of the highway commissioner.

"Better results could be obtained," stated E. Stagg Whitin, speaking for the prison labor committee, "if the prison department remained responsible for the care of the men, as is the case in West Virginia. The highway department is organized to build roads, the prison department to care for the prisoners. Co-operation between the two departments is essential to the successful development of convict road work."

Even under the present system of handling the men, Commissioner Coleman is convinced, after eight years' experience, that prison labor is just as satisfactory and efficient as any other class of common labor, with the additional advantage of being regular and under perfect control.

The State Board of Charities and Corrections, which inspects the county road camps, confirms the commissioner's statement. The board states that the men seem satisfied at the camps, and, as a rule, improve physically after being sent to the camps. The board further indorses the road work by recommending that a law be pasesd sending to the convict road force all men imprisoned over sixty days, including those confined for nonpayment of fines.

Virginia has passed the experimental stage, and healthful outdoor work seems now assured to her prisoners.

Pan American Road Congress.

At a meeting of the Executive Committee of the Pan American Road Congress, held in New York, N. Y., April 16, it was definitely decided to hold the Congress at Oakland, Cal., during the week of September 13. This date was fixed upon, owing to the advantageous arrangements that could be made for halls for meeting places, and also because it was felt that this date would enable engineers who would attend the International Engineering Congress to attend the Pan American Road Congress as well.

The members of the Committee reported good progress, and the outlook is most excellent for a great gathering of road builders. The programme will include speakers of national and international reputation as experts in the construction, repair and maintenance of highways.

Suggestions have been made—and it is believed will be carried out that there be set aside by the exposition authorities one day, during the week of the Congress, to be known as Pan American Road Congress Day.

It is expected that this congress will bring together those interested in highway improvement—not only from all parts of the United States and Canada, but also from the South American countries—all of which will be invited officially to participate in this congress.

The Pan American Road Congress will be held under the joint auspices of the American Road Builders' Association and the American Highway Association. The plans will be made and carried out by an executive committee of five, of which Governor Charles W. Gates of Vermont is Chairman, the other four members of the committee being as follows: James H. MacDonald, former State Highway Commissioner of Connecticut; Major W. W. Crosby, former State Highway Engineer of Maryland; J. E. Pennybacker, Chief, Division of Economics, U. S. Office of Public Roads, and E. L. Powers, of New York.

Four Government Road Engineers to Aid Commissioner Terrell.

E. H. Barber, of Washington, highway engineer in the Government service, has arrived at Frankfort, Ky., to assist the Kentucky State Road Department for the remainder of the year. He is the first of four, who are to come. Commissioner Terrell and Mr. Barber will devote the first few weeks to the preliminary arrangements for the inspection of roads.

A government bridge engineer, sent by the Federal Highway Department, has gone to Bowling Green with R. Wiley, of the Commissioner's office, to look after the construction of a new bridge in place of the one recently destroyed by incendiaries.

The wheel base of the average car listed at over $3,000 has increased steadily for the past five years, jumped from an average of 124 inches in 1910 to 133.2 in 1915. In this period there has been one perceptible increase, between 1911 and 1912, an increase of 5 inches. Since then it has been a steady climb of one each year. The five inch jump was due to the six-cylinder movement which in that year increase from practically zero to 44 per cent.

GOOD ROADS NOTES IN BRIEF

Greenville county, S. C., has been authorized by the legislature to issue $900,000 of bonds for road building.

Hernando county, Fla., will spend $250,000 in building a system of roads by force account.

Yadkin county, N. C., has $60,000 available for building a first-class highway across the county.

Bonds for $30,000 have been issued for road building in Grassy Creek township, Mitchell county, N. C.

Laurel county, Ky., has voted $100,000 of bonds for road building.

Dade county, Fla., has voted bonds for $100,000 for road building.

Cabell county, W. Va., votes on the 22 of this month on a bond issue of $600,000 for good roads.

Monroe county, Tenn., will hold an election on July 15 to vote on a bond issue for roads to the amount of $300,000.

Cook county, Tenn., will vote May 15 on a $200,000 bond issue for roads.

On June 22 Daviess county, Ky., will vote on a $600,000 bond issue for roads.

Roxboro township, Person county, N. C., will vote this month on a bond issue of $75,000 for roads.

Scott county, Va., has awarded contracts for road construction amounting to about $300,000.

Mt. Olive road district, Wayne county, N. C., has let contracts for sand clay roads to the amount of $50,000.

The hustling city of Greensboro, N. C., has let contracts for street paving amounting to $87,000.

Harris county, Tex., has let contract for asphalt paving amounting to $142,000.

The State Highway Department of Louisiana has let contract for 5 miles of road near Jena.

Brunswick county, Va., has contracted for 17 miles of good roads.

Madison county, N. C., has let contracts for 7 miles of road.

Baton Rouge, La., has been asking for bids on 180,000 square yards of pavement.

The city of Lexington, N. C., has completed one mile of concrete sidewalks.

Road district No. 5 of Copiah county, Miss., will open bids June 7 for the construction of gravel roads.

Collin county, Tex., is asking for bids on the construction of 150 miles of roads.

Nashville, Tenn., has sold $430,000 of bonds and will proceed to pave streets with bitulithic, wood blocks, granite block, bituminous macadam and concrete.

Parkersburg, W. Va., will lay vitrified brick paving to the amount of $87,000.

The commissioners of Grady, Chickasha and Canadian counties, Oklahoma, are planning to construct a bridge across Canadian river to cost about $35,000. It will be 1,700 feet long.

The commissioners of Stokes county, N. C., have contracted for a bridge across Buffalo Creek to cost about $4,000. Austin Brothers Atlanta, Ga., landed the contract.

Tulsa county, Okla., has voted $200,000 of bonds to build a bridge across Arkansas river.

The Illinois Highway Commission built last year seventy-six miles of concrete road, eighteen of brick road, and 100 or more miles of macadam roads in Illinois.

The Wisconsin Highway Commission built last year about 200 miles of hard roads; about sixty miles of concrete were laid in Milwaukee county alone.

Kaufman county, Tex., has $200,000 available for building roads and bridges.

A graphic portrayal of the work being done by the American motor truck in the actual fighting at the front in the present European war may be seen in many motion picture productions showing the war maneuvers. To those familiar with the peculiar traits that characterize them, the different makes of cars daily seen, may be picked out in action on the firing lines.

Wanted—Highway work, four years on road, railroad, and municipal surveys; and in charge of construction, can handle men in any capacity. Ten years selling, collecting, office details and cost data. Good references. Graduate in engineering. H. B. Pope, 1014 Floyd, Louisville, Ky.

Good Roads Day in Virginia.

Governor Stuart, of Virginia, set apart May 6 as Good Roads Day in his commonwealth and issued the following proclamation:

"In compliance with a joint resolution of the General Assembly, adopted at its session in 1914, requesting the Governor to designate by proclamation each year one day in the month of May to be known as road day, I do hereby proclaim Thursday, May 6, 1915, to be known and observed by the people of a Virginia as road day.

All citizens are urged to assist in working the public highways of the state on said day. Labor and materials contributed should be under the management of road boards or supervisors directly in charge, to the end that there may be no waste or duplication of effort.

Loyal support for this movement is earnestly to be desired, for far above the value of contributions will be the spirit awakened in behalf of better roads and the object lesson that will be placed before all the people of the state.

Given under my hand and under the lesser seal of the Commonwealth, of Richmond, this, the thirty-first day of March, in the year of our Lord, one thousand nine hundred and fifteen.

(Signed) H. C. STUART,
Governor."

By the Governor:
Secretary of the Commonwealth.

Protection For Roads.

One of the problems in West Virginia road improvement is road protection. It is often a greater problem to keep up and protect a road than to construct it. This is especially true of the roads in the oil fields and lumber districts. Many persons hauling over the roads do not stop to consider that by using the road when it is wet that in one day's time they can and do cause the road more damage than they could repair on several days and often more damage to the road than the value of their time and the produce they haul. Moist or wet earth roads will not support a load of more than 150 pounds per square inch of wheel bearing. The longitudinal bearing of the average wagon wheel is about two inches. Thus a wagon with two-inch tires will have four square inches bearing per wheel or a total bearing of sixteen square inches, which would mean a maximum load for a yet road of 2400 pounds of this width tire and in proportion as the tire is narrower. An inch and three-quarter wagon should only be loaded 2100 pounds, while a four-inch tired wagon could be loaded 4800 pounds.

Another fault that has developed with many persons driving a team and that is the habit of using a rock to scotch their wagons and then drive on and leave the obstruction. Soon the road is filled with large loose stones and then the road man is blamed for not keeping up his road when if the persons that use the road would only co-operate with the officials much money and time could be saved and all enjoy better roads. It is the teamster's interest to have good roads as well as his duty as a citizen to help keep the roads up by protecting them. If we are to get good roads in West Virginia every one will find a place for him to show his patriotism and help. We have 32,000 miles of road passing 96,685 farms and over which 110,344 teams pass if each team in the state was used daily, but many teams are seldom on the roads, while others are daily passengers. If every person that travels the roads would take an interest in helping to keep them up, every one would be benefitted.—A. D. Williams.

1915 Will Be Great Touring Year.

Throughout the United States road officials are everywhere showing themselves keenly alive to the enormous increase in automobile touring manifested this year from all sections, as evidenced by the information they are forwarding to the good roads and touring boards of the American Automobile Association. This information covers the work in progress and the work to be commenced during this month.

The northern routes will be open a month earlier than usual because of the light snows in the Rockies and Cascades. Aggressive action all along the route has come from the recent organization of the National Parks Highway, the road from the Great Lakes, via the Twin Cities, to Puget Sound. After an inspection of every mile this route is to be dedicated on June 15.

The value of competition and construction rivalry is demonstrated by the central routes. The various direct lines and options all through that section have been a stimulant to the greatest activity in placing the various roads of the diffrent highway associations in the pinkof condition, that long distance tourists from the east shall return home with enthusiastic appreciation of the country traveled by them. Of course the Lincoln highway will command a large share of the patronage.

In the southwest, early spring and late fall touring is being looked after by the same active methods of road work, both by road associations and by state officials. The eastern end of this section at present is provided for by several north and south trunk lines to and from prominent points.

In the east, Massachusetts is not letting up in the prestige gained by giving its visitors good touring roads. During the session of the legislature it is expected that $2,000,000 will be appropriated to be spent on the roads in the western part of the state for this year's travel.

That part of the old National Road between Wheeling, W. Va., and Columbus, O., is rapidly coming to the front as a main artery to the west. This 140 miles is being rebuilt, and so much controversy has appeared in the press as to its present useability that an authoritative statement will be appreciated by the many who are planning trips through that section.

The Ohio Valley Automobile Club, of Wheeling, a constituent of the National body of automobilists, has just sent to the Washington headquarters of the A. A. A. a complete report showing that much of that section of the road is not safe to travel. The club has placed signs showing tourists the detour route between Wheeling and Columbus. Work is being vigorously pushed, but the exact date of completion cannot be given.

Automobile Activity Promised for Coming Summer.

Despite the fact that transcontinental motor routes will be laden with traffic this summer, other popular automobile highways will not be minus their annual carbureting caravans. Requests for varied touring data reaching the American Automobile Association indicate that, while unprecedented interest centers around the cross-country arteries, there will be an unusual number of long motor trips through virtually every section that affords travelable roads.

The A. A. A. clearing houses for touring information in New York City and Washington find these outings are now planned with exceeding care, and this has lead to a remarkably increased demand in the number and variety of maps of automobile routes which growth, for several years, the association has been an-

ticipating. In its practice the A. A. A. has developed a method which permits annual revision of the lines of travel shown on each of these maps, thus definitely portraying the road construction work, or any improvement for touring, in any state or section, during each year.

The needs of this procedure has never been better illustrated than in the maps for 1915, because of the large amount of road improvement throughout the U. S. accomplished by the various state and county authorities. This map service is particularly inclusive in showing relative importance and varying values of the automobile routes north, south, east and west. Starting with a road map of the entire country the list ranges through the scale embracing the generally accepted geographical divisions; these are again subdivided into smaller areas. Each division increases in the detail obviously possible by this method of supplying tourable routes.

These maps are part of the service rendered any tourist and inquiries regarding a proposed tour, short or long, may be addressed to the bureaus either at the New York office, 437 Fifth avenue, or the Washington office, in the Riggs building. The possible combinations of routings throughout the country can be fully appreciated by consulting this voluntary association of automobile owners, the funds of which are used for good roads, touring data, and the advance of uniform legislation affecting the motor-driven vehicle.

A good roads meeting was held at Williamsport, Tenn., last month, the gathering being one of the largest of the kind that has been held in the county. There were delegations present from the first, eighth and tenth districts and also from Shady Grove, Hickman county. The farmers and business men present decided to try to get the workhouse hands of the county and leave nothing undone to build the road from Williamsport to Shady Grove, Hickman county, and then from Williamsport to Kettle Mills. A strong committee was named to wait upon the county road commissioners and to make a strong fight for the hands. The committee is composed of John Delk, W. J. Russell, John Faucett, Jas. Jayne, Richard Jewell, W. T. Harris, John A. ones, Albert Sanders, John E. Hight, Frank Baker and Irvine McEwen; the two last named are from Hickman county. If this road should be built it will give a first-class highway from Shady Grove into Columbia via the Williamsport and Hampshire pikes.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC.,

of Southern Good Roads published, monthly at Lexington, N. C., required by the Act of August 24, 1912.

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G. W. Johnson, Greensboro, N. C.

FRED O. SINK,
Sec.-Treas.

Sworn to and subscribed before me this 5th day of April, 1915.

W. H. MENDENHALL, Notary Public.

Calcasieu parish, La., will build 43 miles of roads.

SOUTHERN GOOD ROADS

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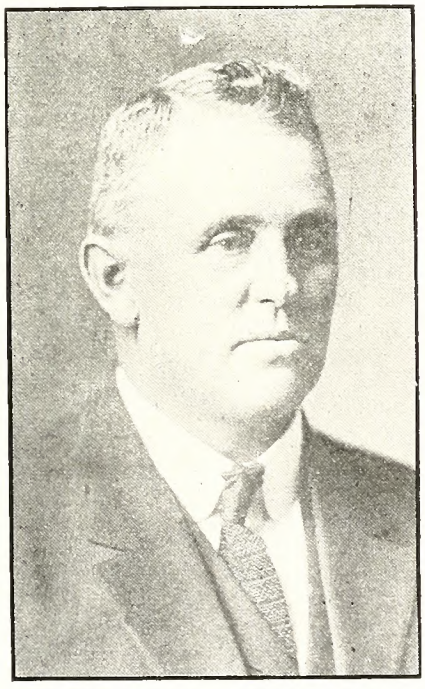
The Economics of Road Construction

By HON. W. S. FALLIS

State Highway Engineer of North Carolina

THE ECONOMICS of road construction is a subject that is a part of every phase of the road question. Every advantage claimed for the betterment of our roads has its economic side. There is no movement to-day that commends itself more fully to the support of all the people than the construction of good roads. There is little danger that too much money will ever be spent for this purpose, if there is proper and intelligent consideration given to the financial and construction problems which it involves.



HON. W. S. FALLIS

It is not necessary for me to discuss the question of the advantage of good roads throughout the counties of our state. I will, therefore, confine myself to discussion of the proper expenditure of the funds to be used in the construction of roads.

Public roads are built for the use of the people free of cost in the same manner as the public school, the museum, or the park; but ,though free in a direct way to the user, they are not free in the economic sense because they have involved expense and effort to some one.

What things shall be provided for public use is a question of great public interest, and one of the most difficult problems concerning taxation to be solved by the legislator and the economist.

Economic goods is a term used to describe those things which men want that are not free, but which present the problems of individual or organized industry.

All the constructive efforts of man are of a temporary nature. No sooner has he completed some construction than both nature and man begin to destroy it. The word permanent in its full sense cannot be properly applied to anything made by man.

This is true of roads, and especially true of the road crust or surface. Rain, frost and traffic are the three greatest agencies tending to destroy it. If the road is to retain its value as a road, if the capital invested therein is to remain unimpaired, a sufficient sum of money must be expended yearly to repair the deterioration caused by nature and by the wear of traffic. If this money is not provided and properly expended, the original investment will in time disapepar through depreciation.

As Dr. Pratt so earnestly insists, good roads should be good for three hundred sixty-five days in the year. This, of course, does not mean that the roads shall be so expensively constructed as to present an unvarying surface, a surface as perfect during the worst weather, and under the most adverse conditions as during the period of the year when all roads are at their best; but it means that the construction shall be such that, within reasonable limits, the efficiency of the road shall be maintained throughout the year, due consideration being given to the cost and class of the surfacing. This can be made practicable only where the roads are skillfully and prudently planned, honestly built, carefully financed, and thoroughly and continuously maintained.

It is not my purpose to go fully into that phase of road economy which would involve a discussion of the subject of raising funds for the work; but I must voice an earnest warning in regard to the expenditure of a certain class of road funds.

It is a common thing for our counties and cities to issue bonds, for extended terms, for the purpose of road and street improvement. In many cases this is a proper way for them to procure funds for much needed improvements; but it is all too common an occurrence, for the money thus raised to be spent in work of a temporary nature. In many cases, where the money is borrowed for say, thirty or forty years, the purpose for

which the bulk of it has been spent has entirely disappeared in perhaps ten years. If recklessness of this nature is persisted in (and no one can deny that it is now very common), a reaction, more or less serious, in the progress of road building is sure to result. The remedy for this is not to prohibit the issue of bonds for either long or short periods of time, where other funds of sufficient amount are not available; but to intelligently and prudently plan the expenditure of such funds, so that a large measure of value may remain in the work at the expiration of the time for which the bonds were issued.

The road surface, in many of its more or less expensive forms, is of such temporary nature that it is extremely wasteful, to say the least, for counties, whose present wealth is such that funds for road improvement are limited, when compared with the amount of mileage and the topographie and other natural difficulties, to expend large sums on surfacing their roads or in ill considered endeavors to secure a large mileage of poorly constructed roads.

When money for the initial work of road improvement in a county is to be expended, no matter how the money has been procured, prudence demands that a careful investigation by competent, trained and experienced men shall be made and definite plans determined upon before any work is begun. This is especially true when money raised from long term bonds is to be used.

A definite plan is needed in order among other reasons to distribute as equally as possible the benefits of the improvement to the tax payers; to eliminate as far as practicable changes in value to the individual property owner, by following as nearly as may be the general course of existing roads; to determine the kind of surfacing; its probable cost, and the probable cost of maintenance; to consider in every phase the future of the system of roads; and to spend the bulk of the money in the more permanent parts of the road. The location, the grade and the drainage of a road are the permanent parts and the only parts that can reasonably be expected to contain any part of the original investment at the time the bonds of a thirty or forty year issue are due.

I, therefore, earnestly urge that the larger part of the funds now being spent on the roads throughout the state be used for laying a foundation upon which, in the future, improved surfaces can be built.

Some Factors in the Actual Work of Construction.

Economy in the actual construction of roads can be assured only when the laws are such as to guarantee to the local or county administration sufficient power to handle to the best advantage the various problems they will have to meet.

The executive body or county board itself should be free from politics and political connections or ambitious, men of unselfish motives and high purposes. This condition in every aspect is, perhaps, unusual but not impossible of attainment, as my own experience has demonstrated.

An engineer should be employed who is competent and experienced and who has a high conception of his profession. Ample power should be given him to decide and enforce all questions that are entirely professional in their nature, and his advice should receive full consideration by the commission where the matter is both professional and administrative. To illustrate. It should be the function of the Commission to plan the order in which the roads should be built; and to name the two or more points between which a road is to be built. It is the right of the engineer to determine all matters relating to the location of the road between these points. He is held responsible for this by the profession generally; by the people of the county especially; by the road commission directly; and therefore, this is his right as a matter of simple justice. Should the question be one of the class or quality of construction to be used at a given place or in the general work, the office of the engineer should be advisory in nature just as a lawyer advises his client.

The question of obtaining right of way for road purposes is vital to all the tax payers, and is an avenue through which a considerable per centage of the county road funds may disappear. This accentuates the necessity of broad justice in handling it rather than a too close observance of the written law.

Experience has taught us that a good road increases the value of land, according to the distance from and the accessibility to it. The value of the land abutting on the road is of course increased, much more than that of land lying farther away. It is seldom possible to injure a farm by building a good road through it, and the place where actual damage can be done is very exceptional.

Every tax payer in the county shares according to his property, the burden of road improvement. He should, therefore, receive his due measure of benefit from the money expended thereon.

In estimating from my experience this item, the cost of right of way for road construction, will, if neglected or allowed to be handled according to the average county law, amount to something like two hundred dollars per mile of road wherever re-location or even partial relocation is required. This money was originally appropriated by the people for the purpose of building roads, and every man paying a road tax has the right to know that his money has been used in building roads. Every dollar spent to pay "A" for right of way gives "A" a dollar and a good road that enhances the value of his farm more than that of the farm of his neighbor which does not touch the road, while it takes from "B," who may be unfortunate enough to live just beyond, a dollar and a good road. The dollar paid to "A" should in all justice go into a road for "B." My experience has proven conclusively that an equitable method of adjustment can be arranged that will not bring undue friction to the road commission nor work harm to any one.

Experience and care are necessary in organizing for work if economy in the work is to be assured. Every effort should be made to keep the overhead or administrative expense as low as possible. When little time and nominal responsibility is required of a board memmer, the expense for his service should be nominal. Members of the County Road Commission, if paid at all, should be paid for the actual time given to the work, I would suggest that the amount should not be designated until the organization has been completed and work well begun, for the reason that the bulk of the work required of or neeessary to be done by members of the commission is several times larger at the commencement of the work than later on. If designated during the time of organization, it will frequently result in larger allowances for the service of executive members than they themselves would consider equitable and just at a later time.

The superintendent and foreman should be men of experience in the class of work they are expected to do, well qualified in every way for handling the machinery, equipment and work. Many mistakes are being made in the selection of these men. They constitute the most important part in the organization, so

far as economy in getting results is concerned. Great care and experienced judgment should be used in selecting just the right man.

A good foreman for this class of work should have the qualifications usually needed by men placed in authority over labor. He should be sober, industrious, sufficiently educated, and a man of good judgment in handling labor; but he should be especially experienced in handling earth excavation by the use of the kind of machinery provided; should know when he is getting results; and should understand thoroughly the proper amount of work to be done by his mules. This last and special experience is vital, for on it depends, more than on any other one thing, the cost of the work.

In an organization requiring a superintendent, and when several outfits are worked, the service of a superintendent as a general executive is absolutely essential for the systematic and therefore economical conduct of the work. His duties are so obvious and at the same time so numerous that I shall not go into details, but simply say that his chief duty is to keep the various outfits in condition to work at their highest efficiency.

It is my opinion, based on my own experience in this class of work, that for the construction of sand-clay or topsoil roads, or for any class of road work where the bulk of the expense will be in the excavation and grading, the most economical method is by county organization in preference to contract work. This is not the result of any prejudice or hasty judgment in the matter, but the result of careful investigation. I have been in common with the majority of engineers, inclined to favor the contract method in many classes of work. The plan of contracting is without a doubt the cheapest in many classes of construction work. In cases where the amount of work in grading is so small that the cost of organization and proper outfit would be excessive in comparison, or where the class or kind of work calls for an expensive outfit that will be useless capital in the hands of the county when the work is completed, I would unquestionably favor contract work.

In support of the idea favoring county organization I would state that the outfit required for road construction when sand-clay or topsoil work is to be done, with the exception of the mules required, may after about two year's work be considered as very nearly or quite worn out when the work is completed, and its value almost entirely incorporated in the work. The depreciation in the value of the mules can, very conservatively be estimated at ten per cent per annum. To demonstrate this, I will refer to the work in Franklin township, Franklin county. The depreciation in the value of the mules, after nearly four years of service, amounted to nine % per annm. The cost of each team per day was .20 6-10 cents of the capital invested therein. The cost per cubic yard of the work, after a careful calculation which included the total cost of all tools and machinery in the expense involved, was not quite fifteen cents. The depreciation of the

Top Soil Road in Wake County, N. C., built under the supervision of Mr. W. L. Wiggs, the gentleman in the buggy.

mnles used in Franklin township was perhaps greater than would ordinarily be the case, as they were used for a longer period than mules should be used. The most economical method of handling this item is to purchase young mules five or six years old and of not less than eleven hundred pounds weight, work them for two or two and one-half years, and sell them before their annual depreciation becomes great on account of their age.

To prefer again to the importance of the qualifications of foremen, I wish to quote some figures that came within my experience.

In one of the counties in which I had charge of the work, I used six outfits of equal equipment and on like work. Two of the foremen were men experienced in the kind of work they were doing. The other four, while energetic, hard working men, had never handled that kind of work. At the end of three months I made an investigation of the results (this investigation should have been made at the close of the first month, but the cost accounting was in such shape that I could not get at it) and found that the two experienced men were handling their work close to sixteen cents per cubic yard, while the other four were averaging around twenty-eight cents. In other words, considering the total yardage handled by the different outfits, the two experieneed men had in each ease given in value about $130 more in work, although I was at that time paying all six of these men the same salary.

I cannot close this discussion without saying something in regard to the keeping of cost accounts, and their importance in holding down the cost of work.

If, in the above referenee to the comparative value of the foremen, I had been able to get at the results of my endeavor to keep track of th costs, I would have saved some hundreds of dollars in that first three months; and this, while very important, is only one of the leaks in construetion work that a proper cost accounting will expose.

The method that is considered sufficient as a rule, simply seeing that the men have worked the number of hours for which they are paid and that the goods were received for which the bills are paid, is an utterly insufficient and worthless handling of a valuable auxiliary for the economical conduct of the work.

I would add in closing that a constant watchfulness over and understanding of all the elements that go into road construction must be constantly maintained by the responsible head of the organization, if the best and most economical results are to be obtained.

State Buys Last Toll Road Into Baltmore.

The State Roads Commission of Maryland last month arranged for the elimination of the last toll road entering Baltimore city, when it decided to purchase the Reisterstown turnpike at an average price of $1,500 a mile. The commission will pay the Reisterstown turnpike Company $1,600 a mile for the pike as far as Hitesew's Hotel, at Reisterstown, and $1,350 a mile between that point and the corporate limits of Westminister, in Carroll county.

An agreement has been reached by the Roads Commission with the County Commissioners of Baltimore and Carroll counties by which the latter will maintain the pike in its present condition until it is improved by the counties under the State-aid law. After such improvement the Roads Commission will take over the pike as a State Road and maintain it as such thereafter.

Central Georgia Towns Pulling for Dixie Highway.

At a largely attended and enthusiastic meeting in the city hall in Griffin, Ga., May 3, leading citizens of Griffin, Jonesboro, Hampton, Sunny Side, McDonough, Orchard Hill, Milner and Barnesville organized for the purpose of making the road from Atlanta to Macon, via Jonesboro and Griffin, a link of the proposed great north and south Dixie highway. It was one of the most business-like meetings ever held in Griffin and one of the most successful, as a result of which the claims of the cities and towns along this route will unquestionably receive the careful attention of the highway commissioners at Chattanooga.

Hon. Julius W. Gresham, president of the Griffin board of trade, and ex-mayor of Griffin, was made temporary chairman of the meeting, and Secretary W. B. Royster, of the Griffin trade organization, was made temporary secretary. Later they were made permanent officers.

After the delivery of the addresses and a thorough discussion of the subject before the meeting a special committee from each of the counties interested was appointed for the purpose of presenting the claims for the Griffin-Jonesboro route in a proper manner, the chairman of each county committee to be members of a special committee of which President Gresham is chairman.

The committees follow:

Spalding—H. B. Kell, chairman; R. F. Strickland, E. C. Smith, Joe A. Rice and Lou M. Castro.

Clayton—A. C. Blalock, chairman; F. P. Camp, W. R. Jester, O. J. Coogler, L. Z. Gilbert, A. G. McDonald and J. R. Minter.

Henry—W. M. Harris, chairman; A. J. Henderson, J. L. Chapman, A. B. Mitcham and Robert E. Henderson.

Pike—C. O. Summers, chairman; Roy Martin, W. H. Mitchell, T. J. Berry and W. C. Jordan.

The general committee was instructed to have J. B. McCrary, of Atlanta, make a complete map of the route from Clayton through Monroe county.

State Aid in Kentucky.

"The state and counties of Kentucky are building roads" said Senator Joseph F. Bosworth, of Middlesboro, Ky., who attended the meeting of the Dixie highway delegates held at Knoxville.

"Under the law of the state of Kentucky we make a levy of five cent state tax roads. When a county will spend so much for roads, the state appropriates an equal amount. The result is that 104 out of 120 counties have taken advantages of the state aid and are building good roads."

In speaking of roads generally, Senator Bosworth stated: "The Boone highway is a certainty and now we are working for the Dixie highway. The Dixie highway will come from Cincinnati to Lexington and then to Richmond, Mt. Vernon, London, Corbin, Barboursville, Pineville and Cumberland Gap. All of the money has been appropriated for good roads and we are building them in Kentucky. This road law is working well in Kentucky and all of our people are interested in the construction of the Dixie highway and believe that if the proper work is done, the Dixie highway can be located east of the Cumberland mountains."

The city of Lexington, N. C., and property-owners, the city paying half, will spend $2,000 in building concrete sidewalks this spring.

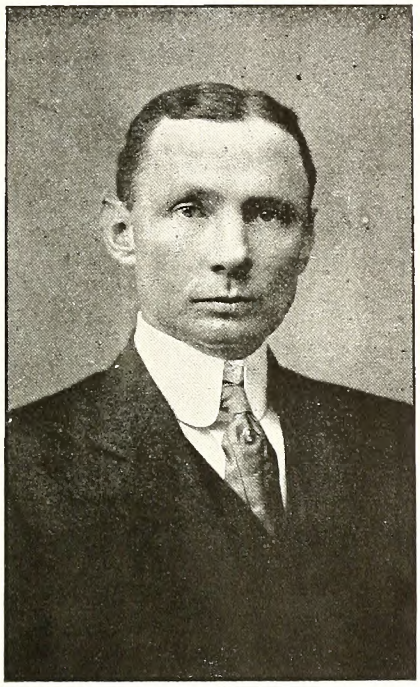
Government Building Roads in Many States

By HON. P. St. JULIEN WILSON

Assistant Director U. S. Office of Public Roads

FEDERAL participation in the improvement of our public roads is far from being a new question. From the very organization of the Republic Congress devoted considerable time to a consideration of the question and Washington urged the importance of connecting the east and the west by means of improved roads.

As early as 1802 an act of Congress provided that 5 per cent of the income from the sale of public lands in Ohio was to be set aside for the construction of free



HON. P. ST. JULIEN WILSON

roads. Two-fifths of this fund was to be expended in the construction of a road from the Potomac River westward to the Ohio River.

Ambitious Act of 1806.

In March, 1806, an act of Congress provided for a great national road to extend from the Potomac to Cumberland, Md., westward to the Ohio River near Wheeling, and thence across the states of Ohio, Indiana and Illinois to the Mississippi River at St. Louis.

Considering the resources of the Nation at that time, this was a tremendous undertaking, far greater in comparison than the Panama Canal of today.

The national road was to be a great highway 677 miles in length, with a right of way from sixty-six to eighty feet wide and graded to a width of thirty feet, of which twenty feet was to be surfaced with broken stone or gravel, while the maximum grade was not to exceed 8¾ per cent.

$7,000,000 Expended.

For thirty-two years congress struggled with the gigantic task. Practically $7,000,000 was appropriated and expended without seeing the completion of the undertaking. In 1838, when congress made the last appropriation, the road had been practically completed to Indianapolis, Ind., and the grading had reached Vandallia, Ill.

In the meantime the railroad had made its appearance and fired the popular immagination with visions of its wonderful possibilites. Even congress was not immune from the popular contagion, for in an appropriation act it was specified that the section throughout the state of Illinois was not to be surfaced, but only graded, so that later, if found desirable, a railroad might be laid down on this grade.

Turned Over to States.

As no further appropriations were forthcoming after 1838, the national road literally lost itself in the prairies of Illinois, and, as the question of the maintenance of the older portions was becoming a tremendous problem, the road was turned over to the tender mercies of the several states.

Except for roads in certain parks and military reservations, no further appropriations for participation in road work was made by congress for a period of fifty-five years.

What is now the office of public roads was originally established by an act of congress, passed March 1883, providing for a bureau of road inquiries in the Department of Agriculture, which should make inquire in regard to systems of road management, determine the best methods of road making, prepare publications, and disseminate information.

Includes Chemical Tests.

These duties have been greatly extended and broadened, so as to include the physical and chemical testing of road materials, conducting field experiments, and supervising the construction and improvement of certain post roads authorized by the postoffice appropriation bill of 1912. Under the reorganization of the department effective July 1, 1915, the name will be changed to "office of public roads and rural engineeering," which will have charge of all lines of engineering work in the department.

In accordance with the above acts of congress, the participation of the Federal government in road matters is very largely limited to experimental, research and educational work. A broad interpretation has, however, been placed on these terms, as it is evident that many lines of highway work are yet far from being definitely established as fixed standards. The office of public roads is keenly alive to these questions, and is working constantly and systematically toward their solution.

The office which is located at Fourteenth and B streets, Southwest, Washington, D. C., is well equipped with office rooms and splendid modern laboratories for the routine testing of all kinds of road materials, as well as for research work.

At the department experiment station farm, Arlington, Va., equipment for testing full-size highway bridges has been provided. Actual service conditions are here duplicated, and the behavior of the concrete bridges are studied as to modern traffic requirements.

These records have now accumulated for a peroid of about fourteen years, and include many thousands of tests, the larger portion of which have been published in Bulletin 44 of the office of public roads.

The Jackson Highway

By MISS MAYE TERESSA HOLDER

IN THESE DAYS it is not unusual to find woman forging ahead despite her feminism.

Miss Alma Rittenberry of Birmingham, chairman of the Jackson highway, says the women of America, who are the greatest monument builders in the world, should apply their time and energy toward the construction of memorial highways instead of bronze and marble statues. Many of her articles have been published in magazines pointing out the importance and advantage of improving the old trails and public highways of this country.

We have all heard about the Lincoln highway from New York to Philadelphia, over the old Lancaster pike (which was the first road in America to obtain a charter) on to Harrisburg, Chicago, across the Rockies to San Francisco. Eighteen months ago this great highway was hardly more than an imaginary line from New York to San Francisco. Now it is the longest transcontinental highway in the world over which one can travel from coast to coast in safety and comfort, and the time will not be long distant when the Lincoln highway will be an ideal road from the Hudson river to San Francisco bay. This ocean-to-ocean highway, of which Mr. Joy of Detroit, president of the Packard Motor Car company, is chairman, will be the first one to be built, and will be a great tribute to Abraham Lincoln. It was first planned by the Lincoln highway association to have the committees secure the right of way first, the material, and several million dollars, and then have the government engineers to build.

Other highways are being talked about. The Atlanta-New York highway, which comes down through Virginia, the Carolinas and Georgia, is fast materializing.

The Jackson highway, which was launched under the auspices of the Alabama Daughters of 1812 in the spring of 1911, of which Miss Rittenberry was made chairman, is also destined to be a certainty, and while Miss Rittenberry is much interested in good roads in general, she is directly concerned in the construction of the proposed Jackson Memorial highway, and with her characteristic effectiveness, she has made this great transcontinental highway possible. This highway is planned through the richest territory in America: From Chicago to Indianapolis, through Louisville; out of Louisville over the "Lincoln way" to Lincoln farm, down the old Louisville and Nashville pike to Mammoth Cave, on to Nashville, out to the Hermitage. The Ladies' Hermitage association desire the Jackson highway from Nashville to the Hermitage to be a large, broad boulevard. From Nashville it still follows the old Louisville and Nashville pike down through middle Tennessee to the Alabama line (when the Jackson Memorial bridge is built) crossing the river at Decatur, to Birmingham, Montgomery, Mobile, on to New Orleans. This highway when built will be a grand monument to "Old Hickory."

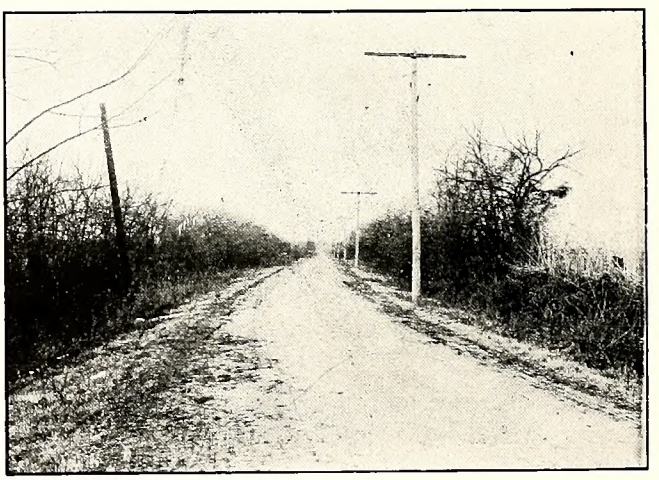
At the Auto Salesmen's convention, which met in Indianapolis in November, 1912, Miss Rittenberry, as chairman of the Jackson highway, was invited to tell about the work, and the chairman of the convention, Mr. Will Kiser, read some resolutions on the Jackson highway, which were indorsed by the convention.

The plan for the building of the Jackson highway is to have those counties, which the highway will cross, issue bonds for the working over of the old county turnpikes running north and south and connect these turnpikes to form the highway. This the work will be done by the county and state, the roads being under control of the different states. Federal aid to help them in their project is not objected to by the Daughters of 1812, but they think they will get the Jackson highway quicker by bond issues.

Of the eight national highways proposed in congress, not one was to Jackson, and not one connected the lakes and gulf coming through Louisville and Nashville. So the Daughters of 1812 proposed to fill in the missing link, thereby memorializing the name of Andrew Jackson.

The Lakes to the Gulf Highway association, of which Mr. Pendleton Beckley, city attorney of Louisville, is president, which was organized in November, 1912, at Mammoth Cave, is almost identically the same route as the Jackson highway, and it has been proposed that the two go together.

Many miles of the Jackson highway are already built. One can go all the way from Louisville to Chicago in an automobile. Through Illinois, Indiana, Kentucky, Tennessee and Alabama the Jackson highway will pass some of the finest farming lands in this country. Many beautiful country homes are along the route, and the building of this continuous highway will mean much to the men and women on the farms, making life more attractive to them and eliminating much of the forced and tiresome drudgery.



Gravel Road Near Montgomery, Alabama

Miss Rittenberry has given much of her time and thought to this project since it was publicly launched. In fact, she originated the idea of the Jackson highway. She has traveled extensively in its interest, and only a few months since she made a second trip along the route of this proposed highway, paying her expenses to Chicago and back by selling a copyrighted picture post card of Andrew Jackson and the Hermitage. Miss Rittenberry is well informed about the old roads and trails of America, and is cognizant of almost everything that ever happened along the Santa Fe trail, the old post road up the Hudson valley and the Natchez trace, which Jackson converted into a military road.

The Jackson highway is the biggest piece of work in the way of a monument any patriotic organization has ever undertaken. The Colonial Dames have mark-

ed historic sites, the Daughters of the American Revolution are marking the old Santa Fe trail, and have their Continental hall, but it is especially fitting that the Alabama Daughters of 1812 should take the initiative in this Jackson Memorial highway because the state of Alabama was more concerned in the war of 1812 than all the other states combined, for it was the battleground.

As a monument commemorating the 100th anniversary of the peace treaty signed at Ghent in 1814, the highway from Quebec to Miami, Fla., is to be built.

The proposed Dixie Highway that had its birth at the Good Roads meeting in Atlanta last November is another good project for the south. One of the most ardent supporters, if not the originator of this idea is Mr. Gilbreath, Secretary of the Hoosier Automobile Club, Indianapolis. This route has not been clearly defined, but is supposed to begin at Chicago or Detroit, through Indianapolis or Cincinnati down through Lexington, Ky., to Danville, a section of country noted for its beautiful blue grass farms and good turnpikes, through Eastern Kentucky—perhaps over the Boone trail to Knoxville, to Chattanooga either by Rome, Ga., or over the Johnson-Sherman Highway (by Dalton and Resaca) to Atlanta, down through Macon, through "the heart of Dixie," to Jacksonville, down the east coast to Miami. This would be a grand highway, and there is one needed through this especial territory northwest of Atlanta.

Stands by Jackson Highway.

"The road that runs by home," said Sol Caheen, of Birmingham, to an Age-Herlad reporter, "is the road in which we are vitally interested—that is the Jackson highway, which was launched by the Daughters of 1812, some four years ago, the one that Miss Alma Rittenberry, who, as chairman or executive head, has worked so diligently for, and almost unaided.

"It was launched as a trunk line road from Chicago to New Orleans, through the cities of Indianapolis, Louisville, Nashville, Decatur, Birmingham, Montgomery, Selma and Mobile, on to New Orleans. When this road is built, which should be before any other highway is constructed through Alabama, we will get a number of northern tourists that will come down to Birmingham on the way to New Orleans and from Montgomery; they can go across over through Georgia to Florida, which seems to be the Mecca for northern tourists.

"If the people all along the line and the commercial clubs in the different cities would take some concerted action, and the Lakes-to-the-Gulf association and the Jackson Highway association combine and hew strictly to the route of least resistance, in 12 months we would have a broad highway from Chicago down to New Orleans.

"It useless to think of building a highway through any county or state except by bond issues. If federal aid is given, why not stipulate that federal aid be given to build bridges across rivers. When you get a bridge built across a river at a given point the counties will build the highway to that bridge. It seems to me that Decatur is the most logical place to build a bridge, being half way between Florence and Huntsville, and a more direct line from Birmingham. Let's pull for the Jackson highway, and not go on any more wild goose chases, like some did after the Dixie highway, which was planned and launched by people outside of the state, and not always being after something which some other town or city has already launched while we were asleep.

Mr. Light to Aid Pan-American Road Congress.

Col. Charles P. Light, field secretary of the American Highway Association, has been loaned by the directors of that organization to the Pan-American Road Congress until the close of the big meeting which is to be held in Oakland, California, during the week of September 13. It is expected that the congress which is held under the anspices of the two leading road organizations of America, the American Highway Association and the American Road Builders Association, will bring together representatives of the organized road movement throughout the entire United States and that it will have a large official representation from Canada and the Central and South American countries.

In lending Col. Light to the congress the American Highway Association is contributing largely to the success of the meeting as it is generally conceded that no man in the road movement today is more widely known and more generally liked than Charlie Light. His work will be largely concerned with the sub-committee on finance of which James H. MacDonald, formerly state highway commissioner of Connecticut is chairman. It is expected that Col. Light will also confer with city and county officials, commercial and road organizations and others interested in the road movement for the purpose of making known the character and scope of the annual Road Congress and to urge that strong delegations be named.

During Col. Light's absence the association will continue its important projects among which is the co-operation with the Bureau of Municipal Research and the Federal Office of Public Roads in legislative compilation and analysis. A new project which holds great possibilities and an educational medium will involve the preparation of a series of educational papers dealing with road building, maintenance and management and the publication of such papers locally to co-operate with county papers. It is expected that this series of papers will deal in an elementary yet fundamental manner and will aid powerfully in making known in local communities the proper methods of road building, maintenance and management. During 1915 it is estimated by the American Highway Association that nearly $200,000,000 will be spent locally for the building and maintenance of roads. The time has come therefore for the greatest care to be exercised in the expenditure of local road funds rather than in urging increased expenditure.

The Good Roads Sentiment in Eastern Kentucky.

The good roads sentiment continues to gain in public favor throughout the whole of Eastern Kentucky, many of the towns and counties preparing to call elections for the voting of the bonds necessary for the construction of the highways. The next few years will see a complete system of good roads all over the mountains, Letcher, Pike, Floyd, Johnson, Perry and Harlan countoes are likely to vote for bonds this year, and owing to the interest at this time, the issue will carry largely. The Big Sandy Valley counties have formed a permanent good roads association which will have much to do with the good roads campaign in the different counties. In the Kentucky river district the counties of Letcher, Perry and Breathitt are enthusiastic on the subject.

The board of commissioners of Buncombe county, N. C., let contract last month for surfacing with Aztec and Texaco asphalt six miles of the Asheville-Weaverville road.

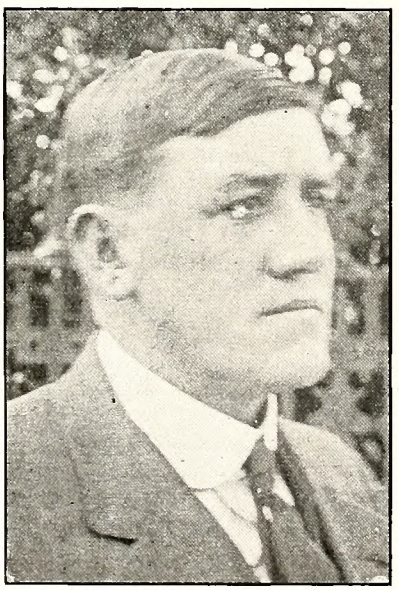
Cement Clay Gravel Streets

By J. C. McALLISTER

Superintendent of Streets, Wilmington, N. C.

DURING the years 1913 and 1914 the city of Wilmington, North Carolina has constructed upwards of 100,000 square yards of Cement Clay Gravel streets supplied from the deposits at Lillington, North Carolina, which are operated by the Cape Fear Gravel Co.

All of this work has been done by the city forces under the direct supervision of the superintendent of street. The city uses a ton of cement clay to cover every four square yards, and ten men with four teams have been all the force necessary to haul and put in place on the street four hundred square yards of pavement per day. The extraordinary cheapness of this paving material has proven a great boom for Wilmington, taking into account its fine appearance and permanent value.



J. C McALLISTER
Superintendent of Streets, Wilmington, N. C.

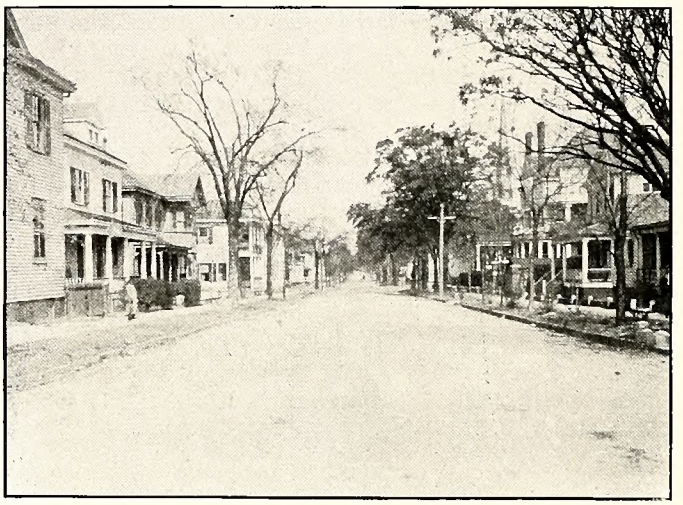
Most of the streets were originally sand from six to eight inches in depth and increased the difficulty and expense in hauling.

The first cement clay gravel streets from the Lillington deposit was laid in Wilmington in the year 1910. Ever since this the city has used this material. During the year 1914 about 75,000 yards of cement gravel streets were completed. Remarkable as it may seem, though some of these streets have been used for nearly five years, no money has been expended for maintenance and repairs. This fact, and taking into account the low cost of cement clay gravel makes for it the just claim that it is the cheapest paving material for the money that can be supplied any community.

Several of the streets have been treated with a flush coat of tar or asphalt, which is found to adhdere as readily to cement clay gravel as to macadam or other material.

The advantage of cement clay gravel over macadam, among other things, is that the gravel streets will wear down smooth and will not ravel and the aggregate makes a homogeneous mass of water proof material. Experience has shown that this pavement does not disintegrate or wash away but wears uniformly.

The writer is satisfied from close observation and experience that this cement clay gravel, which must



South Street, Wilmington, looking north from the Dock. A cement gravel street

not be confounded with ordinary gravel, makes a roadway that far excels broken stone. It is agreeable to horses because of its resiliency and automobilists like it because of its ease.

Illinois' Road Dragging Rules.

Illinois Highways, the official organ of the state highway commission, prints the following suggestions for profitable road dragging:

Make a light drag.

Ride on the drag, don't walk.

Don't drag a dry road.

Drag when the road is muddy.

Drag, if possible, immediately before a freeze.

Begin at one side of the road, returning on the opposite side.

Always drag a little earth toward the center of the road until it is raised 10 or 12 inches above the edge of the roadway.

Do not attempt to move very much material at one time with a drag.

If the drag cuts in too much shorten the hitch.

The amount of earth the drag will carry can be regulated by the driver, according as he stands near the cutting end or away from it.

When the roads are first dragged after a muddy spell, vehicles should drive, if possible, to one side until the road has had a chance to freeze or partially dry out. The exercise of a very little care on the part of the users of the road will do quite as much as the drag toward securing a smoother road. The law provides a penalty for anyone who wilfully ruts or cuts up a dragged road.

Jackson, Tenn., will lay 35,000 square yards of paving.

Modern Bituminous Surfaces and Bituminous Pavements

By ARTHUR H. BLANCHARD

Professor Highway Engineering, Columbia University, New York City

ALTHOUGH bituminous pavements have been in use in American municipalities for nearly fifty years, the introduction of modern bituminous surfaces and bituminous pavements in the construction of highways outside of built up districts is of comparatively recent origin in America, dating from about 1906. This point is well illustrated by the fact that in 1908 the total yardage of bituminous surfaces and bituminous pavements constructed under the jurisdiction of the eight leading state highway departments in the eastern part of the United States was only 416,700. Since that period the growth of the use of bituminous materials in

ARTHUR H. BLANCHARD

the construction and maintenance of roads and pavements has been exceedingly rapid.

In order to avoid misunderstandings the various methods of using bituminous materials referred to in this paper will be explained by the following definitions:

Bituminous surfaces are those consisting of superficial coats of bituminous materials with or without the addition of stone or slag chips, gravel, sand or materials of a similar character.

Bituminous macadam pavements are those consisting of broken stone and bituminous materials incorporated together by penetration methods.

Bituminous gravel pavements are those consisting of gravel and bituminous materials incorporated together by penetration methods.

Bituminous concrete pavements are those having a wearing surface composed of stone, gravel, sand, etc., or combination thereof, and bituminous materials incorporated together by mixing methods.

The definitions of bituminous surfaces and bituminous concrete pavements quoted above have been advocated for adoption in the reports of the special committee on "Bituminous Materials for Road Construction and Standards for Their Test and Use" of the American Society of Civil Engineers, whereas the fundamentals of the above definition of bituminous macadam pavements are emboded in the following quotation from the 1913 Report of the Association for Standardizing Paving Specifications: "If the stone is spread in place and the bituminous cement or binder applied afterwards, the resulting product is bituminous macadam." As sheet asphalt pavements have been in use for many years and as the essentials of good construction have been well established, this type of bituminous pavement will not be dealt with in this paper.

Bituminous Surfaces.

Since the formulation of the fundamental principles of the successful construction of tar surfaces by the engineers of the Departments of Roads and Bridges of France in 1903, bituminous surfaces have been used extensively in Europe. As an illustration might be cited the construction of five million square yards of tar surfaces in one county of England in 1911 under the supervision of the county surveyor, of Kent, H. P. Maybury, M. Inst. C. E. During the past eight years American engineers have used bituminous materials in this method of construction and maintenance of roads and pavements.

In the case of broken stone and gravel roads, the most efficient method of procedure is to thoroughly clean the surface by sweeping with hand brooms or horse sweepers and hand brooms, the final sweeping being done with bass or other fine fibre brooms. The bituminous material, which is generally heated, is applied to the surface in amounts varying from one-quarter to one-half gallon per square yard with the aid of pouring cans, hose attached to tanks, hand drawn gravity distributors, horse drawn or motor truck gravity or pressure distributors. Some kind of mineral coating is generally applied to cover the bituminous material. The degree of cleanliness of the surface obtained by sweeping will depend to a large extent upon the details of the original construction. It has been found that a road with a thoroughly rolled and well puddled broken stone wearing surface composed of road metal from one inch to two and one-half inches in longest dimension may be easily cleaned and the essential adhesion of the bituminous surface readily assured. This method is characteristic of the modern practice of many of the foremost English and French engineers.

Considerable development has taken place in the use of different kinds of bituminous materials. Tars, both of the water-gas and coal-gas types, continue to be used to a large extent. Without doubt the most comprehensive specifications for the construction of bituminous surfaces with tar are those adopted by the

Road Board of England. There has been noted a growing objection to the use of certain asphaltic oils which require from two to three weeks to "set up" to such an extent that tracking will not occur.

Bituminous Macadam and Bituminous Gravel Pavements.

Bituminous macadam and bituminous gravel pavements are of many types, one of the primary differenees in construction being the use of one or two applications of the bituminous material. The efficacy of many of the types depends upon the combinations of sizes of broken stone or gravel and the combinations of bituminous materials used when two applications are employed. Variations in types also exist dependent upon the manner in which the different courses may be filled and the treatment of the filled course prior to the application of the bituminous material. The one application method is very similar in its simplest form to the construction of a bituminous surface except that the bituminous material is applied upon a much more open surface. In the ease of the two applieation method in certain instances an attempt is made to build up a two course pavement, while in others the second application is in reality used as a seal coat.

Two of the main difficulties in the construction of bituminous macadam pavements have been to secure a thoroughly compacted wearing eourse of non-segregated broken stone and the uniform application of the bituminous eement so that the broken stones of the wearing surface would be uniformly bound together. In connection with the above statement should be noted the following except from the 1914 report of the special committee of the American Society of Civil Engineers:

"An important factor for successful results (in the construtcion of bituminous pavements by the penetration method) is the thorough eompaction by rolling of the road metal before the spreading of the bituminous material."

Two methods which have given satisfactory results will be cited as examples of modern practice.

When the metalling in the wearing course consists of a naturally graded aggregate ranging in sizes from one-half inch to an inch and one-quarter, it has been found unnecessary to further fill the voids by the application of a finer product before the first application of the bituminous material. The character of the product referred to above is shown by the following mechanical analysis:

Percentage passing ½ inch screen	18.9
Percentage passing ¾ inch screen	43.1
Percentage pasing 1 inch screen	34.4
Percentage passing 1¼ inch screen	3.6
	100.0

After the wearing course has been thoroughly rolled, from one and one-quarter to one and three-quarters gallons to the square yard of bituminous material is uniformly distributed. Stone chips, free from dust, are then distributed to fill the surface voids. After the chips are rolled a seal coat of one-half to one gallon per square yard of bituminous material is applied. The pavement is finished by the rolling of a second application of stone chips.

As the second method will be described what the speaker considers the most satisfactory type of bituminous macadam pavement at present constructed in England. The bituminous pavement referred to is known by the name of "Pitchmac" and was designed by the City Engineer of Liverpool, John A. Brodie, M. Inst. C. E. The following description of the standard method employed in Liverpool is given by Mr. Brodie:

"Pitch grouted macadam has been found to give most satisfactory results in streets of medium and light traffic, and is now being largely used in place of ordinary macadam, and also of more expensive pavements. It is laid to a depth of from 3½ inches to 4½ inches, in two layers. Welsh granite macadam is used, broken to a 2½ inch gauge for the lower layer and to 1½ inch for the top surface. Each layer is put down dry and continually rolled before and after the grouting of pitch and sand mixture has been applied, until the surfaee is thoroughly consolidated. The foundation is generally of hand-pitched rock, 10 inches deep as for ordinary macadam, but in some cases a bed of 6-inch concrete has been used on main roads. Pitch macadam is also being much used as a surface covering for old boulder pavements, many of which still exist in Liverpool in old streets where the traffic is very small. The cost of pitch macadam may be taken at 1s. (24 cents) per square yard per inch of depth."

Bituminous Concrete Pavements.

Bituminous concrete pavements other than sheet asphalt and pavements laid by companies as proprietary articles have received more attention during the past three years than at any time since the days of Abbot, Leverich, Scrimshaw, and Van Camp. Less fear of litigation proceedings and the introduction of economical mixing machines equipped with heating attachments have exerted a marked influence. But, furthermore, the rapidly growing recognition of the inherent advantages of bituminous pavements constructed by the mixing method has been largely instrumental in its adoption for traffic conditions for which it is believed to be economical and suitable. Bituminous concrete pavements, in which broken stone forms an integral part of the mineral aggregate, may be divided into three classes.

It is self-evident that the simplest type is one having a mineral aggregate composed of one product of a crusher, that is, similar to the product, in the usual type of portable crushing and screening plant, which passes over one screen and through the larger holes of the adjacent screen. This broken stone, in certain cases, may be somewhat uniform in size but usually such is not the case. In the speaker's opinion, an essential element in the construction of this type of bituminous concrete pavement consists in using a product of a crusher whch will have a range from an inch to an inch and a quarter in its sizes. As an illustration will be cited a mechanical analysis of a product which was obtained from a plant where the broken stone passed over a one-half inch screen and through a one and one-quarter inch screen.

Percentage passing ⅛ inch screen	1.2
Percentage passing ¼ inch screen	4.2
Percentage passing ½ inch screen	34.7
Percentage passing ¾ inch screen	40.6
Percentage passing 1 inch screen	17.3
Percentage passing 1¼	2.0
	100.0

It is apparent that the above product would not be referred to as composed of uniform sized stone. It is of interest to note that certain bituminous concrete pavements, having a width of twenty-five feet, constructed with this product of broken stone in 1911 have been subjected to an average daily mixed traffic of two thousand to three thousand vehicles and are at

present in excellent condition with no maintenance charges to date.

This type of bituminous eonerete has been oenstructed for many years by using either one or in certain eases, several courses of broken stone mixed with bituminous eonerete. As an illustration of the latter method will be eited the praetiee of one large construction company whieh builds this type of pavement. The first, or bottom course, of metal coated with bituminous cement ranges from one and one-quarter to two and one-half inehes; the second course, from one-half inch to one and one-quarter inches; and the third course, from one-quarter to one-half ineh. The pavement is finished with a dressing of uncoated ehips.

Asphalts, tars and tar-asphalt eompounds have been used for the bituminous eement. In some eases one kind of bituminous material has been used in the mix and another kind for the seal eoat; one of the most eommon combinations being the use of tar in the mix and asphalt for the seal coat.

As illustrative of some of the details of construetion of this type of bituminous concrete pavement whieh should be eovered in eontraets, excerpts from speeifications recently drafted by Mr. Prevost Hubbard and the speaker for the New York State Department of Efficiency and Economy will be eited. It should be borne in mind that the temperatures and other limitations specified apply to the bituminious cements and mineral aggregate covered in other sections of the speeifications.

"Broken stone for the bituminous eonerete shall be heated, as direeted, before entering the mixer, to between 66° C. (150° F.) and 149° C. (300° F.) in revolving dryers in which no flames shall be permitted to eome in contact with the broken stone and in which the broken stone shall be continuously agitated during the heating.

"The asphalt cement or refined tar shall be heated in kettles so designed as to admit of even heating of the entire mass, with an efficient and positive control of the heat at all times. Asphalt cement shall be heated as directed to a temperature between 135° C. (275° F.) and 177° C. (350° F.). All asphalt cement heated beyond 177° C. (350° F.), either before or during mixing with the broken stone, shall be rejected. Refined tar shall be heated as directed to a temperature between 93° C. (200° F.) and 135° C. (275° F.). All tar heated beyond 135° C. (275° F.), either before or during mixing with the broken stone, shall be rejected.

"When thoroughly heated to the temperature directed, the asphalt cement or refined tar and the broken stone for the bituminous concrete shall be mixed so that the resulting mixture shall contain between five (5) and seven and one-half (7½) per cent by weight of bitumen as directed. A mixer shall be used, having revolving blades, and so designed and operated as to produce and discharge a thoroughly coated and uniform mixture of nonsegregated broken stone and asphalt cement. When discharged, mixtures of asphalt cement and broken stone shall have a temperature not more than 149° C. (300° F.) and not less than 93° C. (200° F.) as directed. When discharged, mixtures of refined tar and broken stone shall have a temperature not more than 121° C. (250° F.) and not less than 66° C. (150° F.), as directed.

"The bituminous concrete, heated and prepared as specified, shall be delivered direct from the mixer to the point of deposition on the foundation in trucks or

A View on Fourth Street, Wilmington, .N. C., Cement Gravel Construction

wagons, provided with canvas covers for retaining the heat. As delivered the bitnminous concrete shall have a temperature of at least 66° C. (150° F.). Material having a lower temperature than this shall not be laid upon the foundation.

"Rollers used on the bituminous concrete and the seal coat shall be well balanced, self-propelled, tandem rollers, weighing between ten (10) and twelve (12) tons each. Each shall have a compression under the rear roller of between two hundred (200) and three hundred and fifty (350) pounds per linear inch of roll, and shall be provided with an ash pan, which shall prevent ashes from dropping onto the bituminous concrete or seal coat.

"As soon as possible after the compaction of the bituminous concrete, when the surface is clean and dry, a seal coat of the hot asphalt cement shall be evenly distributed over the bituminous concrete and spread by means of squeegees as directed. The asphalt cement shall be applied at a temperature not less than 135° C. (275° F.), nor more than 177° C. (350° F.), at a rate of one-half (½) to one (1) gallon per square yard, as directed. A thin, uniform layer of dry, clean, No. 1 broken stone (stone chips) shall be immediately spread over the asphalt cement, as directed, by machines or skilled workmen. The spreading of the No. 1 broken stone shall not lag more than twenty (20) behind the placing of the asphalt cement coating. Number 1 broken stone shall not be placed on the wearing course before the asphalt cement of the seal coat is applied. The surface of the bituminous concrete shall be kept scrupulously clean until the seal coat is applied, and the contractor shall not permit any hauling over the wearing course before the completion of the seal coat.

"No bituminous concrete shall be mixed or placed between October 1 and May 15, except by written permission, and no bituminous concrete shall be mixed or placed when the air temperature in the shade is below 10° C. (50° F.), or when the foundation is damp or otherwise unsatisfactory." The second type usually consists of the broken stone composing one product of a crusher and sand or other fine mineral matter mixed together with a bituminous cement. The wearing surface of this mix is sometimes finished by rolling in fine stone chips but generally a seal coat is used together with fine mineral matter for a top dressing. When constructed on a commercial scale, the mineral aggregate is always heated and mixed in a specially constructed machine. Usually the same grade and type of bituminous material is used for the mix and seal coat.

In the third type of bituminous concrete pavement the composition of the mineral aggregate is definitely covered in properly drawn specifications. As an example may be cited the following method of covering the composition of the mineral aggregate of Warrenite, a proprietary pavement of the Warren Brothers Company, which was used by William H. Connell, chief of the Bureau of Highways, in drafting specifications for the city of Philadelphia.

"Material passing 1¼ inch screen and retained on No. 2 sieve, 40 to 60 per cent. Material passing No. 2 sieve and retained on No. 4 sieve, 10 to 20 per cent. Material passing No. 4 sieve and retained on No. 10 sieve, 10 to 5 per cent. Material passing No. 10 sieve and retained on No. 30 sieve, 10 to 5 per cent. Material pasisng No. 80 sieve at least 25 per cent of which will pass a No. 200 sieve, 10 to 5 per cent. The balance, to pass No. 30 sieve and be retained on No. 80 sieve."

The 1914 specifications of the state of New Jersey contain the following description of the grading of a bituminous concrete pavement similar to the one given above.

Size of Screen Passing—	Percentages Minimum.	Maximum
1½" and retained on 1"	0	15
1", retained on ½"	40	50
½" and retained on ¼"	10	25
¼" and retained on a 10-mesh sieve	8	15
10 and retained on a 30-mesh sieve	12	22
30 and retained on an 80-mesh sieve	5	15
80 and retained on a 200-mesh sieve	3	8
A 200-mesh sieve	2	8
Bitumen content	6.5	8.5

As another illustration might be cited the well known Topeka specification, which covers a definite grading of a mixture of broken stone and sand. The Topeka grading is as follows:

Percentage of bitumen	from 7 to 11
Percentage of mineral aggregate passing screen—	
200 mesh screen	from 5 to 11
40 mesh screen	from 18 to 30
10 mesh screen	from 25 to 55
4 mesh screen	from 8 to 22
2 mesh screen less than	10

In the construction of all types of bituminous concrete pavements, in addition to the requirements covering the properties of the bituminous cement and the quality and character of the mineral aggregate, certain essential features should be given careful consideration. The following citations from the 1914 Report of the Special Committee of the American Society of Civil Engineers are especially pertinent:

"Where the character of the traffic justifies the use of a bituminous concrete pavement, the same conditions demand an extraordinarily strong foundation therefor.

"The amount of bituminous material to be used in any case will depend upon the peculiar conditions of that case, such as the kind of road metal and of bituminous material, the character of the aggregate, the climatic conditions, etc.

"The character of the mineral aggregate to be used may be controlled by local conditions, but the best results can only be obtained by the use of the best materials. Excessive sizes, or excessive variations in the size of the mineral particles, should be avoided, and utmost care must be taken to avoid the segregation of the different size particles.

"Mixing machines should be used, and hand-mixing methods should be avoided wherever practicable.

"In the use of a heated aggregate for the construction of a bituminous concrete pavement non-uniformity or excess in the heating of stone should be avoided.

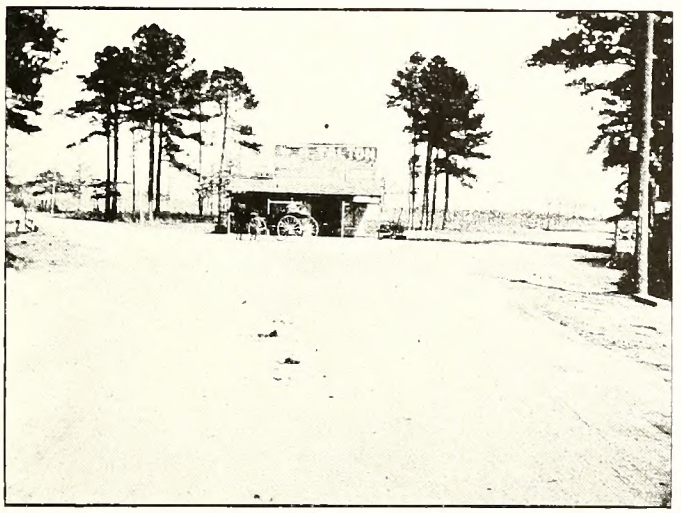
"Where bituminous pavements are laid, the edges should be protected and a sudden transition from the pavements to any softer shoulder material avoided by means of cement concrete or other edgings and such reinforcement of the shoulder material as may be necessary."

The state of Louisiana will have 550 miles of improved road by the first of next year. These roads will be built at a cost of $2,000,000. The state highway commission has planned a system of roads, 5,000 miles in length, reaching every part of the state and the mileage to be completed this year will form part of the system.

Instructions for Good Roads

By LEROY W. ALLISON, Newark, N. J.

In connection with a recent state wide "Road Bee Day," of two days duration, the State Highway Department, Michigan, issued an interesting and instructive advisory bulletin to highway and road officials throughout the state, explaining the opportunity afforded for a real campaign of road betterment and improvement, and setting forth terse and valuable data. These instructions, signed by Mr. Frank F. Rogers, State Highway Commissioner, were arranged to con-



At Fork of Pikesville and Stantonsburg roads at Greenleaf, Goldsboro township, Wayne county, N. C. Mr. F. F. Snowden, of Snowden was engineer in charge of construction of this road

vey in a few words, necessary information to inspire active co-operative efforts in making the event a substantial success, incorporating the following:

Don't try to do too much.

Don't start more than you can finish. You cannot build a macadam road, nor very long stretches of gravel road in two days.

Don't haul gravel onto roads that have not been properly graded and drained.

Don't grade roads that have not been properly staked out on correct lines.

Don't plow up long stretches of road and leave them impassable.

Don't scrape sods onto the traveled roadway and leave them for passing vehicles to smooth down.

What May Be Done to Advantage.

You can remove logs, rocks, stumps and stones from the roadway; fill holes, preferably with good earth; cover stretches of sand with clay or gravel; drain wet places in the roadway; scrape off the outwards sod margins where they hold the water in the traveled track.

When drained and graded, clay may be covered with sand or gravel, but the gravel should not contain any clay unless it is to be placed on sand.

Culverts may be repaired, or new culverts put in.

Road drags (of planks or split logs) should be made and arrangements perfected for using them after rains, throughout the season, on all clay and loamy soils.

Organization.

All these things will be of great value to the roads of the state, but they will not be accomplished unless the work is well planned and performed under intelligent supervision.

Let each community organize by road and school districts and appoint the best road builder in the neighborhood as "road boss" for two days, and then turn out and work loyally under his direction.

Compiling Road Laws.

To aid legislatures in revising road laws and framing new road legislation, a series of papers dealing exhaustively with existing road laws in each state will be issued under an arangement made by the legislative committee of the American Highway Association with the Bureau of Municipal Research of New York City. The complete compilation of road laws already thoroughly indexed and brought up to date has been submitted by the Committee to A. N. Johnson, highway engineer of the Bureau of Municipal Research, for use in the prearation of a series of papers and charts which will indicate the laws in each state which are conflicting, obsolete, vague or superfluous, and the lines along which simplicity and efficiency in revision may be obtained. Included in the publications to be issued will be suggested models for laws covering state aid to road improvement; the use of convict labor; the issuing of bonds for road construction; the management of local roads; the regulation of traffic, and other related subjects of legislation. Charts illustrating graph-

Showing alignment and type of road on Central Highway, near Craven-Carteret line. Picture taken from top of a big pine. This was one of the worst roads in the state when Mr. R. F. Snowden, engineer, started to improve it

ically the points of similarity and dissimilarity in the respective state systems will also be prepared.

The American Highway Association through its legislative committee first secured the effective aid of the U. S. Office of Public Roads in compiling all road laws and the work which will now be done by the Bureau of Municipal Research is a further step in turnig this great fund of information to best advantage. The third step in this important undertaking will comprise personal conferences and hearings in connection with state legislative programs by experts whose serves will be arranged for by the Highway Association. In its field propaganda work the association is represented by Charles P. Light, field secretary, and its office headquarters work in Washington in charge of I. S. Pennybacker, executive secretary.

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Official Organ Southern Appalachian Good Roads Association
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THE LIBERTY BELL BY MOTOR TRUCK.

Mr. Charles Henry Davis, president of the National Highways Association, has made an unusual request of the mayor of Philadelphia. He has asked that official to allow his association to take charge of the famous Liberty Bell and transport it to the Panama Exposition at San Francisco by motor truck. He offers to safeguard the famous bell in every way possible and carry it through without expense to the city of Philadelphia.

Mr. David points out that if the Bell is carried through the nation by motor truck, it may be seen by 22,162,528 people, counting only those who live in the counties that will be traversed. Counting the people who live in adjacent counties, more than 33,000,000 will be enabled to see the bell.

The request is a reasonable one and should be granted. The Liberty Bell belongs to the people of the United States. The city of Philadelphia holds it in trust for them and the people have a right to see it. Only a few people, a very small percentage of our great population, will ever be able to go to San Francisco or to Philadelphia to see it and the privilege should be given them.

It would be a fine thing to carry the Bell to San Francisco over the Lincoln Highway and return by way of the Southern National Highway, so that all sections of the nation might have the opportunity of seeing it.

The Liberty Bell and all that it stands for, is very dear to the hearts of all of the people.

MORE TOURING ROUTES WANTED.

The predictions made by the automobile organizations, the American Motorist, and others, that this summer would see an immense increase in touring in America, has already been fulfilled. No such interest in touring has ever been manifested in this country.

It is signficant, too, that the would-be tourists are seeking new fields for exploration. They are tired of the north-east, even with its fine roads and are turning longing eyes southward and westward. Thousands, even hundreds of thousands, will traverse the continent this summer for the California expositions and daring motorists will pierce the wilds of the Appalachian region, even though that section has few good roads.

There is an insistent demand for information about the roads in Virginia and the Carolinas. Thousands of motorists who can't afford the time and money to make the trans-continental trip, would like to make a shorter run into Virginia, to see the historic battle-fields of the Civil War and of the Revolutionary War.

Many thousands would explore the wonders of our Appalachian regions if they could. The time is coming when our fine scenery and our historic battle-fields will be made easily accessible but it is a long way off.

THE GRAVEL ROAD.

The South is building sand-clay, top-soil and gravel roads at a great rate these days, the first two varieties leading. The gravel road usually costs more than the sand-clay or top-soil road and for that reason it does not receive the attention it deserves. Often, too, gravel is hard to secure, but in the main gravel road mileage is small because gravel roads are not appreciated.

In this issue Mr. Paul D. Sargent, chief engineer of the State Highway Commission of Maine, formerly with the U. S. Office of Public Roads and a road builder of national reputation, discusses the merits of the gravel road. He makes the statement that if he were compelled to choose one type of road for all kinds of conditions, he would choose gravel. His article is worthy of the careful attention of every road-builder in the South.

"SEEING GEORGIA."

There is much to be gained by such tours as that conducted by the Georgia State Chamber of Commerce last month. They called it a "Seeing Georgia" tour and that was what it was. A company of 130 patriotic Georgians, in 30 cars, made up the party and they spent five days in investigating the resources, and in getting acquainted with the good people who live in central and western Georgia.

The tourists lost no opportunity of boosting the

good roads movement. The people turned out in great crowds everywhere to see them and at every point along the line they found road sentiment in plenty. All Georgia is for good roads.

We would like to see the example of the Georgia State Chamber of Commerce followed all over the South. Many states have no state organizations of this kind but scores of live, progressive Southern towns have chambers of commerce, or similar organizations, and these local organizations would find it easy to conduct like tours. There are always plenty of road enthusiasts, live motorists and energetic business boosters in every good town to work up a successful tour.

These tours do worlds of good. They not only serve to give impetus to the good roads movement but they are trade builders for the towns that promote them and they help to bring the farmer and the townsman closer together.

Topics of Discussion for the Pan-American Road Congress.

The executive committee of the Pan-American Road Congress has received word from the officials of the Tri-State Good Roads Association that it has been decided to co-operate with the Pan-American Road Congress by changing the date of the Pacific Coast Good Roads Congress from the week of August 2nd to that of September 13th. This means the practical merging of the meeting of the Tri-State Association into that of the Pan-American Road Congress.

At the meeting of the executive committee which was held in New York City May 22nd, it was felt that the co-operation that will thus be secured through the action of the Tri-State Good Roads Association will be of very material assistance in making the Pan-American Road Congress, to be held in Oakland, Cal., September 13-17, the greatest gathering of its kind ever held in the world.

The Pan-American Road Congress, as already announced, will be held under the direct auspices of the two leading national good roads organizations, namely, the American Road Builders' Association and the American Highway Association. Plans for the meeting are in the hands of an Executive Committee, made up of Governor Charles W. Gates of Vermont, Chairman, and two members from each of the two organizations.

Progress reports of the various sub-committees were submitted at the meeting of the executive committee last week. It is apparent that great interest is being taken by the public in the forthcoming congress. Official invitations will soon be issued to all the several states of the United States, the Canadian provinces and the South American ocuntries to send delegates.

While the topics have not as yet all been assigned to the speakers, the following subjects were decided upon at the last meeting of the committee:

"The History and Future of Highway Improvement," "The Benefits and Burdens of Better Roads." "The Relation of the Road to Rail and Water Transportation," "The Responsibility for Road Conditions, and the Way to Secure the Improvement of Road Conditions," "Tree Planting and Roadside Aesthetics," "The Essentials of Proper Laws for Highway Work," "Highway Indebtedness; its limitation and regulation," "Organization and System in Highway Work," "The Educational Field for Highway Departments," "System in Highway Accounting," "Uniformity for Highway Statistics and Data," "Engineering Supervision for Highway Work," "The Merit System in Highway Work," "The Determination of the Justifiable Outlay for Specific Cases of Proposed Highway Improvement," "Proper Road Location; its importance and effects," "Road Drainage and Foundations," "Highway Bridges and Structures," "Roadway Surfacings," "Resurfacing old Roads," "Street Pavements," "Convict Labor for Highway Work," "Equipment for Highway Work," "Motor Traffic; its developments, trend and effects," "Load and Tire Effect and Regulation," "Comparisons of Traffic and their Economic Values," "Maintenance, Materials and Methods," Dust Suppression and Street Cleaning."

Convict Labor in the South.

Highway construction by state prisoners in the southern states is the subject of an investigation which the National Committee on Prisons and Prison Labor and the Graduate Highway department of Columbia University have jointly undertaken. Convict road work in the north was similarly treated last year, the result of the study being published in the January issue of the proceedings of the Academy of Political Science.

The possibility of employing the misdemeanant in road work is also under investigation at the present time. When the three studies are completed, the prison committee will be in a position to afford accurate and scientific information to all those attempting to direct convict road work, no matter in what section of the country their work lies or what type of convict they are called upon to handle.

The southern study is being conducted by James Wilmot, C. E., who has been in charge of convict road gangs in Louisiana and other southern states and is familiar with both the southern convict and the southern road.

The need for good roads in the agricultural districts of the south is admitted by all, while already in Georgia, Virginia, North Carolina, and other states it has been demonstrated that the convict can be a most useful factor in procuring these roads. Up to the present time the work has been hindered by the faulty legislation under which it has had to be developed, and the weakness with which even this faulty legislation has been administered.

The convict has to a certain extent benefitted by the healthy outdoor work and the fact that he is trained in work in which there is a constant demand for laborers and in which it is easy to obtain employment upon release. Up to the present time wage has not been paid the prisoner for his work on the roads in any of the southern states, or in any state but Iowa. The popularity of convict road work has seemed to lie in the fact that it is a cheap means of securing good roads through the exploitation of the prisoner.

The National Committee on Prisons and Prison Labor holds that the value of the prisoner's labor is the same as that at which free labor can be secured to do the same work and that only when this wage is paid will convict labor be efficient labor.

Mr. Wilmot's study will include careful investigation of the labor cost for this work, as well as of the different systems of control, and on this scientific data the committee will base recommendations which it is hoped will lead to the efficient development of convict road work in the southern states.

The city of Greenville, S. C., has voted $100,000 of bonds for streets.

GOOD ROADS NOTES
GATHERED HERE and THERE

Alabama.

The Alabama Good Roads association is making an active effort to organize a county good roads association in every county in the state. Secretary J. A. Rountree reports that much progress is being made in this special work and that the good roads advocates see the importance of organizing in their respective counties.

The headquarters of the association reports that Rev. J. W. Cary, field agent and state organizer, perfected the St. Chair County Good Roads association recently with the following officers: Judge J. L. Herring, president; Perkins McClendon, vice president; W. T. Hodges, secretary; Wm. J. Mims, treasurer.

The Springville branch of the St. Clair County Good Roads association was organized with eighteen members and the following officers selected: T. E. Moody, president; H. I. Crandall, vice president; M. W. Foreman, secretary; L. A. Bradford, treasurer.

Plans for a monster good roads meeting to be held at the Hermitage hotel in Nashville in June to promote the Jackson memorial highway between Chicago and New Orleans have been received at the office of W. S. Kellar, state highway engineer. These plans were sent by Miss Alma Rittenberry of Birmingham, one of the chief promoters of the highway.

This highway runs directly through Alabama, entering the state between Decatur and Nashville, and leaving the state just below Mobile. The Montgomery-Birmingham highway is a portion of the Jackson memorial highway.

Under the present plans, the meeting will be held at the Hermitage, and all persons along the route from Chicago to New Orleans will be invited to attend. Many persons owning automobiles will be asked to make the trip to Nashville in their machines.

* * *

Georgia.

The people of Georgia are scrapping over the location of the Dixie Highway in that state. Savannah is working hard to have it run from Atlanta to Savannah and from Savannah south to Jacksonville. The mayor of Savannah has appointed strong committees and they are working hard for it.

At a big mass meeting held in Quitman, the people of the western and southwestern part of the state got in action. Delegates from Moultrie, Berlin, Pavo, Barvick and Quitman, in Georgia and Madison, Live Oak and Lake City in Florida, organized the Georgia-Florida Highway Association.

The organization was perfected with a two-fold purpose, that of presenting a main line highway route from Chattanooga to Quitman in Georgia, and from Madison to Jacksonville in Florida, with subsidary tapping lines of the main highway from various points along the route, such as from Columbus to Albany and from Tifton to Moultrie and Bain bridge to Quitman. In addition it was announced that the association was not only to present a Dixie Highway route but that it was organized to perfect a network of highways in Western Georgia and Northern Florida. Both the Georgia Legislature and the Florida Legislature will be asked to appropriate funds to assist in the keeping up of these highways, and it is believed that within a few years the roads of the association will be able to secure federal funds to supplement the funds of the state and the counties through which they pass.

* * *

Kentucky.

The engineering task of overseering and inspecting the state aid work on the county roads promises to be a heavy one on the road department of Kentucky this year. With seven field men, including three furnished by the Government, twelve counties in Central Kentucky are left to be looked after by Commissioner of Roads R. C. Terrell, and Robert Reese, the only road engineer remaining on duty in Frankfort, while eleven mountain counties have no one in charge and cannot have until more help is allowed.

It is estimated that four or five counties constitute about all an engineer can hope to inspect properly; but each of the field men has from ten to eighteen counties under his supervision. Commissioner Terrell has been for weeks assigning the territory, considering train schedules and automobile routes, and making arrangements as best he could for the transportation of the engineers to and from interior counties.

W. F. Brooks, of the federal department, will have all the counties west of the Tennessee River and Livingston and Lyon besides.

J. A. Whittaker, of the federal department, will have Allen, Caldwell, Christian, Hopkins, Logan, Muhlenberg, Simpson, Todd, Trigg and Warren.

J. F. Grimes will have Barren, Breckenridge, Butler, Daviess, Edmonson, Grayson, Hancock, Hardin, Hart, McLean, Meade, Monroe, Ohio, Union and Webster.

W. McDyer will have Adair, Bullitt, Larue, Marion, Nelson, Spencer, Taylor and Washington.

R. E. Toms, of the federal department, will have Bath, Bourbon, Clark, Fleming, Madison, Menifee, Montgomery, Nicholas, Powell and Rowan.

M. D. Ross will have Boone, Boyd, Bracken, Campbell, Carroll, Gallatin, Grant, Greenup, Harrison, Kenton, Lewis, Mason, Owen, Pendleton, Robertson and Trimble.

T. B. Webber will have Bell, Casey, Clinton, Garrard, Knox, Laurel, Lincoln, McCreary, Pulaski, Rockcastle, Russell, Wayne and Whitley.

The office will look after Anderson, Boyle, Franklin, Henry, Jefferson, Jessamine, Mercer, Oldham, Scott, Shelby and Woodford, leaving no one yet assigned to Carter, Elliott, Floyd, Johnson, Knott, Lawrence, Leslie, Letcher, Magoffin and Martin.

* * *

Maryland.

What the state road commission of Maryland has done in the last eight years is summed up by the Manufacturers Record as follows:

In 1908, when the State Roads Commission of Maryland was created, $5,000,000 worth of bonds were authorized for the purpose of commencing the building of a network of state roads, connecting Baltimore city with the counties and the county-seats with each other. With the completion of this arterial system of

modern state highways, in about 90 days, the state of Maryland will have over 1000 miles of improved roads built and maintained to the present time at a total cost of about $17,564,464. Of this 1000 miles of hard-surfaced roads, approximately 650 is macadam, 200 concrete and 150 of sand, vitrified brick and other materials.

Beginning with 1910, 46 miles of road were constructed; in 1911, 87; in 1912 154; in 1913, 203, and in 1914-15 the system is to be completed except as to a few short stretches of secondary feeders. The average cost per mile for the work of construction, including preliminary surveys and plans, bridges, culverts, inspection, superintendence, rights of way and other miscellaneous expenses of every character was $10,481 in 1910, $12,296 in 1911, $10,837 in 1912 and $8,286 in 1913, with a general average of $9,986 for the aggregate of 456 miles finished on the main system up to October, 1914. To accomplish the work of maintenance road machinery and equipment to the amount of $47,430 was purchased in the years 1908-11, and $23,917 in 1912-13, making a total of $71,347. Included in the equipment are 15 steam road rollers, 14 sprinklers, 4 stone-crushing plants, 8 motor cycles for inspection purposes, 5 sweepers, 1 large convertible oiling motor truck, 1 complete concrete mixer, 22 dump wagons and miscellaneous tools. All the machinery is kept in repair, and an inventory of it is recorded in an equipment ledger. As no special fund was provided for the purchase of the machinery, it has been charged against the regular appropriation. Comparatively little additional equipment has been purchased in 1914-15.

The average maintenance cost, including oiling at least once a year, patrol services, etc., is $463.45 per mile. If the Baltimore- Washington Boulevard of 40 miles and the 35-mile Annapolis Boulevard were excluded, the maintenance per mile would be only $440.06, as the immense traffic between these points requires a higher average of upkeep per mile.

All the roads are constructed and maintained exclusively by the state, the funds being provided by the sale of 15-year state road bonds, of which the total appropriation up to October, 1914, was $15,770,000. For maintenance the state appropriates 1 per cent. of the tax rate, which means about $95,000, and a portion of the automobile tax, bringing the total up to about $275,000 a year.

* * *

Massachusetts.

Massachusetts has just passed an act providing for the improvement and repair of highways by convict labor.

The act provides that county commissioners may make arrangements with the Massachusetts Highway Commission, or with the officials of a city or town, to work prisoners on a highway, or with a private owner to improve waste land by means of such prison labor.

The National Committee on Prisons and Prison Labor, while approving most thoroughly of the road work, takes exception to the latter part of this act. There is ample work for all prisoners, both state and county, in state and county work and under no circumstances should they be employed for the benefit of private individuals, not even though the work be under state control. This is only another form of the contract system which the committee has found unjustifiable from every standpoint.

The Massachusetts statute contains the excellent provision, however, that the work shall be under the supervision of the state highway authorities, but the prisoners shall remain under control of the prison officials. This makes possible the proper organization of the work and promises success in the undertaking.

The development of the road work should afford such opportunity to the prisoners to labor to good effect that the national committee looks for an amendment to the statute at the next session and the abolition in Massachusetts of every form of contract convict labor.

* * *

Tennessee.

The legislature of Tennessee, in the session that has just closed, passed a state highway bill, which has for its ultimate object the creation of a system of highways connecting the county seats of the state. The work of letting out the system is placed in the hands of the state highway commission, which consists of three men appointed by the governor, and the state geologist, and the Dean of Engineering at the state university, as ex-officio members. No provision is made for the construction of highways, but there is provision for the maintenance of such as have already been or will be constructed along these routes that form a part of the state highway system. The funds for this work are derived from taxes on motor vehicles.

Tennessee will have two able representatives on the commission which will determine the route for the Dixie Highway. Gov. Thomas C. Rye has conferred the honor of sitting on this commission upon Col. A. M. Shook, one of Nashville's foremost citizens, and Judge M. M. Allison, a prominent jurist of Chattanooga. At the conference of governors held at Chattanooga April 3 a resolution was adopted authorizing each of the governors of the seven states interested to name two members of a commission. After very careful deliberation Gov. Rye named Col. Shook and Judge Allison to represent Tennessee on the commission, and there is no doubt but that his action will have the hearty endorsement of those interested in the great highway project.

Col. Shook has long been recognized as one of the leading capitalists of the South, and a man whose high standing will give weight to any enterprise with which this name may be associated. It is a matter of congratulation to the great highway enterprise that a man of the ability of Col. Shook has been selected as one of the commissioners, and he will doubtless be a strong factor in working out the problems that may come before the commission in the selection of the route and all other matters incident to its construction.

In the selection of Judge Allison another appointee is named who will measure up to all of the requirements of the duties of the position. Judge Allison stands in the front rank as a lawyer of sterling ability. Judge Allison's early life was spent in North Georgia, he having been brought up on the farm. When a young man he was admitted to the bar, and in 1904 won the nomination for circuit judge of the Sixth circuit after a brilliant campaign, receiving the nomination in the judicial convention after 100 ballots had been taken. He was elected, and again re-elected in 1910 after serving a term of six years. In 1913 he resigned to enter the practice of law with Robert Pritchard, after whose death the firm became Allison, Lynch & Phillips. He is about 50 years old.

The selection of Col. Shook and Judge Allison assures fair treatment for all interested in the location and completion of the highway through Tennessee. As there is such great rivalry to secure the highway it is

fortunate that two men of this high class have been selected to handle the interests of Tennessee.

Gov. Rye sent a telegram to Judge Allison, notifying him of his appointment, as follows:

"Hon. M. M. Allison, Chattanooga, Tenn.—Having entire confidence in you as one who will honestly endeavor to discharge any trust with absolute fidelity and justice to all concerned, I have selected you, in connection with Col. A. M. Shook, to represent Tennessee in locating the Dixie highway, which must and will be completed in due time, despite the delay complained of. I trust you will do me the honor to serve in this capacity."

* * *

Texas.

The Agricultural and Mechanical College of Texas now has the largest highway engineering division of any college in the south and in the United States excepting only Columbia. Three men all of whom are highway engineering graduates and have had actual experience in supervising road construction direct the operations of this department of the state agricultural and mechanical college in Texas.

R. L. Morrison, a graduate of Columbia and a road builder of much practical experience is professor of highway engineering and in charge of the department. Associated with him as associate professor of highway engineering is B. K. Coghlan, of the University of Illinois. Mr. Coglan previous to his coming to the A. & M. College of Texas was with the New Mexico State College of Mining Engineering and in addition had charge of road construction in several counties of New Mexico.

G. D. Marshall who has been with th office of public roads, United States department of agriculture, recently was assigned to the A. & M. College of Texas as extension worker in good roads. Mr. Marshall has worked through every state in the sonth and in addition to his experience in advocating good roads construction has had active work in road building with this department.

Work in highway engineering is given students in the engineering school. In addition the road men at A. & M. engage in extension work. Texas has gone 'wild' over road construction within the last few years and much of this enthusiasm for better highways is the result of the consistent and efficient efforts of the good roads men at A. & M.

A road materials testing laboratory thoroughly equipped for all kinds of tests has been in operation at the College for the past three years and distinctive service has been rendered the state along these lines.

What is generally expected to prove the biggest roads meeting ever held in Texas will be held at the Agricultural and Mechanical College of Texas, College Station, Texas, this next August, the dates being August 4-5. At that time the Texas Good Roads Association together with the county judges and county commissioners association will meet at the college, guests of the highway engineering department.

R. L. Morrison, professor of highway engineering at the college is bringing together an enormous display of road materials and road building machinery. A program of instructive address together with round table discussions of much practical value is being planned also.

The Knox county, Tenn., Good Roads Commission has laid out a system of roads comprising about 130 miles and will proceed to construct it. The commission has $500,000 available for the work.

Charleston, S. C., will lay 65,000 square yards of paving on a concrete base. There will be about 25,000 square yards of creosoted wood blocks and the remainder will be sheet asphalt, or asphaltic concrete.

Cheraw township, of Chesterfield county, South Carolina, has voted $40,000 of bonds for the building of a system of gravel roads. Steer Pen township, of the same county, voted $23,000 of bonds for the same purpose.

The town of Palmetto, Fla., will spend $150,000 in brick paving.

GOOD ROADS NOTES IN BRIEF

Grayson county, Tex., has voted $900,000 of bonds to complete the county's macadam road system. This will make a total expenditure of $1,550,000 for roads. This amount will build 225 additional miles of macadam.

Whitley county, Ky., has voted $250,000 of bonds for road building.

Marion county, Ky., will build about 14 miles of pike road this summer.

Collin county, Tex., has contracted for 125 miles of road.

Anderson, S. C., is asking for bids on 75,000 square yards of street paving.

Private citizens in Gordon county, Tenn., have raised about $12,000 for the improvement of a stretch of road in that county with a view of obtaining the Dixie Highway.

Salisbury, N. C., is contemplating a bond issue of $200,000 for street improvements.

The commissioners of Anson county, N. C., have let contract for the building of a sand clay road from Wadesboro to Lillesville.

Blount county, Tenn., will build roads with the proceeds of a $300,000 bond issue recently voted. $100,000 of these bonds have been issued.

On July 7th, Walker county, Ga., will vote on a bond issue of $75,000 for roads.

Clarksville road district or Red River county, Tex., voted bonds last month for roads amounting to $300,000. White Rock district of the same county, voted $20,000 of road bonds.

Road District No. 1 of Lavaca county, Tex., has voted $50,000 of bonds for roads.

A special road district is to be formed in Dade county, Fla., and $100,000 of bonds issued.

Marion county, Tenn., will issue $40,000 of road bonds, of which $15,000 will be used on the Dixie Highway.

Volusia county, Fla., will vote this month on a $400,000 bond issue for roads.

St. James Parish, Louisiana, has voted $200,000 of road bonds.

La Fourche Parish, La., will build 20 miles of roads with the proceeds of an $80,000 bond issue.

Vermilion parish, La., has contracted for 9 miles of roads.

The State Road Commission of Maryland has let contracts for road work amounting to $65,700.

Baltimore, Md., has contracted for additional paving amounting to $38,000.

Dallas, Tex., will pave several streets with an appropriation of about $30,000.

Dermott, Ark., will spend $30,000 in improving streets and sidewalks.

Road District No. 7 of Jefferson county, Ark., will build 18 miles of roads.

Ohio county, W. Va., will spend $165,000 in road building.

Montgomery county, Va., has contracted for an 80-foot steel bridge across Tom's creek.

The city of Petersburg and the commissioners of Chesterfield county, Va., are contemplating the erection of a 5-span reinforced concrete bridge across Appomattox river, to cost about $165,000.

Fauquier and Rapanhannock counties, Va., will bridge the Rappanhannock river at a point 16 miles from Front Royal. The bridge will be 178 feet long.

Meeting at Knoxville for Dixie Highway.

An "eastern route" for the Dixie highway was warmly endorsed by representatives of twenty-three counties in Tennessee and Kentueky along the proposed route at the meeting of good road enthusiasts at the Board of Commerce, Knoxville, Tenn., May 4. A representative from each of the counties represented was named to compile data on highways in their respective counties and return same to Chairman A. F. Sanford, of Cumberland Gap, Tenn., at the earliest possible moment.

The meeting was called to order shortly after 10 o'clock by Chairman Sanford. R. P. Williams was elected secretary.

Enthusiasm was at a high pitch. While the eastern route was designated as the one desired, no points were specifieially mentioned. The exaet route is not expected to be determined until the county representatives make their reports. Then it will be possible to decide through whieh towns it would be more advantageous to pass.

To prepare data on the highway to send to Chairman A. F. Sanford, after their return home, the following were selected: Frank Long, Grainger county, of Rutledge; W. P. Monroe, Union county, of Maynardsville; T. W. Crawley, Anderson county, of Clinton; A. F. Sanford, Knox county, of Knoxville; J. A. Reagan, Loudon county, of Loudon; Capt. W. E. McElwee, of Roane county; Capt. E. A. Wyatt, Rockwood, of Kingston; H. H. Frasa, Rhea county, of Dayton; Ben D. Jones, Monroe county, of Sweetwater; W. T. Roberts, McMinn eounty, of Athens; G. L. Hardwick, Bradley county, of Cleveland; G. H. Hardwiek, James county, of Cleveland; Eugene Cowles, Shelby eounty, of Shelbyville, Ky.; W. O. Davis, Woodford county, of Versailles, Ky.; Edward L. Quarles, Fayette county, of Lexington, Ky.; Jas. S. Boggs, Madison county, of Riehmond, Ky.; R. L. Collier, Lincoln county, Crab Orchard; Jas. Maret, Roekcastle county, of Mount Vernon; D. C. Edwards, Laurel eounty, of London, Ky.; Thos. Hubbard, Knox county, of Barboursville; Dr. J. H. Parker, Whitley county, of Corbin, Ky.; Judge J. H. S. Morrison, Bell county, of Cumberland Gap; H. G. Murray, Campbell county, of LaFollette.

National Highways Association's "Seeing America" Tour.

See America is the keynote of the National Highways Transcontinental Tours. No better opportunity has ever been offered for those who are desirous of seeing their country than these tours, the first leaving the Headquarter of National Highways Association at 18 Old Slip, New York City, June 15th over the wonderful Old Trails route.

The battlefield of Gettysburg, the Old Cumberland Road whieh served as the first means of communication between the coast and the settlers in Ohio and Indiana and then the Old Santa Fe Trail—a succession of wonder sights. Relics of the past life of the trail, the excitement and bloody Indian strife, trappers and traders posts, the shades of Kit Carson and Dick Woodfin and others famous as early American pioneers. The peaceful present day Indian villages ;the vestiges of a civilization antedating any thing in America, standing and in good preservation, the oldest house in America, built in 1520. Old missions, old pueblos and oldest of all the works of nature, desert vegetation, a riot of color defying even the impressionist school of art. Sunsets that for vividness and splendor are unequalled anywhere in the world. The petrified forest, the megaphone rock

and the grandest of all, the Grand Canyon. The slipping down gradually into California's beauty and the gem exposition, San Diego, a coast ride along the Pacific and finally the Golden Gate.

The daily exercise and fresh air of such a trip puts new life into the jaded, creates new enthusiasm for this great country of ours which they are seeing, makes patriots of the coldest blooded. Best of all you travel only while you are awake so that you see it all.

Colonel D. H. Winslow, of the United States Department of Good Roads, in charge of the Washington-Atlanta Highway, northern section, which reaches from was at Boydton, Va., a few days ago, on his regular inspection tour of the route, and had something to say about the condition of his section of the highway. He reports that the route is getting in excellent shape rapidly, and the causeway leading up to the bridge over the Dan and Staunton Rivers at Clarksville, which form the Roanoke River, has recently been made passable. This will be good news to tourists, who experienced some trouble at that point during the bad winter season.

The commissioners of Durham county, N. C., have contracted for four steel bridges.

The town of Sylva, N. C., has contracted for a 70-foot concrete bridge to connect two sections of the town on each side of the river.

The commissioners of Tulsa county, Okla., have engaged architect to make plans for a concrete bridge across Arkansas river to cost $200,000.

The city of Houston, Tex., has contracted for a $15,000 bridge across Harris bayou, on Main Street Boulevard.

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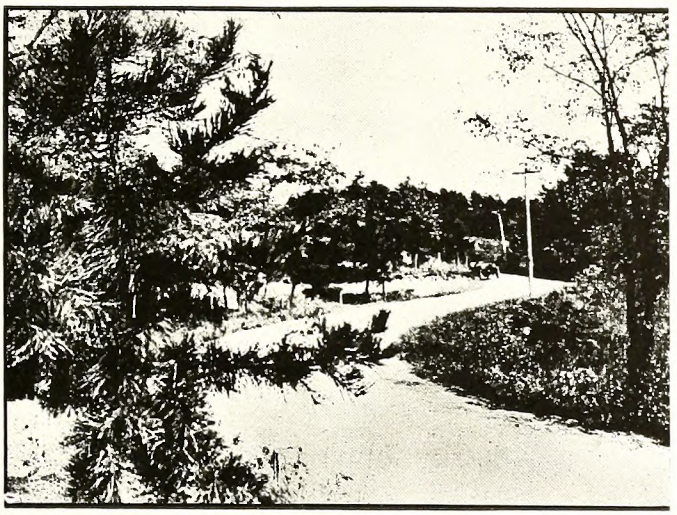
North Carolina Good Roads Convention July 14-16

GOVERNOR LOCKE CRAIG, and Congressman Jas. J. Britt of the Tenth Congressional District, will be two of the principal speakers at the Annual Convention of the North Carolina Good Roads Association which meets in Asheville, N. C., July 14-15-16. Governor Craig will address the convention as the governor of the State and Chairman of the State Highway Commission. Everyone knows that Governor Craig is a good roads enthusiast and it is expected that in this speech he will probably make a suggestive outline of state policies with reference to road building and road maintenance and the enormous gain to the various counties and to the state as a whole from the following out of such a course. Congressman Britt will discuss the subject of "Federal Aid to Public Roads." This particular feature is one of the livest subjects in connection with the good roads question throughout the entire country. Mr. Britt is a figure of national importance and his utterances are regarded seriously by the people of the country.



Stretch of Macadam on the Waynesville-Asheville Highway

Mr. W. S. Fallis, State Highway Engineer, will discuss the subject "North Carolina State Highway Commission," and inasmuch as this commission was created at the last session of the legislature this paper will embody a general outline of the duties of the State Highway Commission and its advantages to the townships and counties as well as to the state as a whole.

Hon. John C. Drewry, chairman of the legislative committee, will speak on "The Association and The State Highway Commission." The North Carolina Good Roads Association was probably responsible for the creation of the State Highway Commission, and Mr. Drewry will, no doubt, relate some interesting history in connection with the work of the association in its fight for the establishment of the State Highway Commission.

Other speakers expected to be present at the convention and subjects to be discussed are as follows:

Working the Prisoners Without Guards—William A. McGirt, Chairman, Board of Commissioners, New Hanover county.

Sanitary Jails and Camps—Dr. W. S. Rankin, Secretary, State Board of Health, and Dr. Joseph Hyde Pratt, State Geologist.

Right Drainage and Grading—Dr. J. H. Squires.

American Ingot Iron—Mr. Wilson Wood.

General Subject for Discussion—"Maintenance of Public Roads."

Address—Hon. E. L. Daughtridge, Lieutenant Governor of North Carolina.

Maintenance of Highways—D. H. Winslow, Highway Engineer of United States Office of Public Roads.

Section of the Central Highway between Asheville and Black Mountain, N. C. A fine "Oxomobile" road

The Relation of Drainage and Grading to Maintenance—(Speaker to be named.)

Maintaining the Road from Farm to Market—Hon. W. A. Graham, Commissioner of Agriculture.

The afternoon session of July 14th will be taken up with addresses of men prominent in national affairs. Among these it is hoped to have present Hon. John H.

Small and Hon. Lee S. Overman. Following these addresses will be reports of committees and election of officers for ensuing year.

This meeting of the North Carolina Good Roads Association bids fair to be the largest in attendance and the most important of any of the meetings of this association. Asheville is noted as a convention city and for its hospitality, and for the good roads that have been built and are now building by the very progressive Board of County Commissioners of Buncombe county. It is interesting road history in the south that the Asheville and Buncombe County Good Roads Association was the first organization of its kind to be established south of the Mason & Dixon line, with such men as E. C. Chambers, Dr. M. H. Fletcher, Dr. C. P. Ambler, B. M. Jones, F. Stikeleather, J. E. Rankin, H. W. Plummer, Dr. C. V. Reynolds, Frank Loughran and a number of other leading citizens of Asheville.

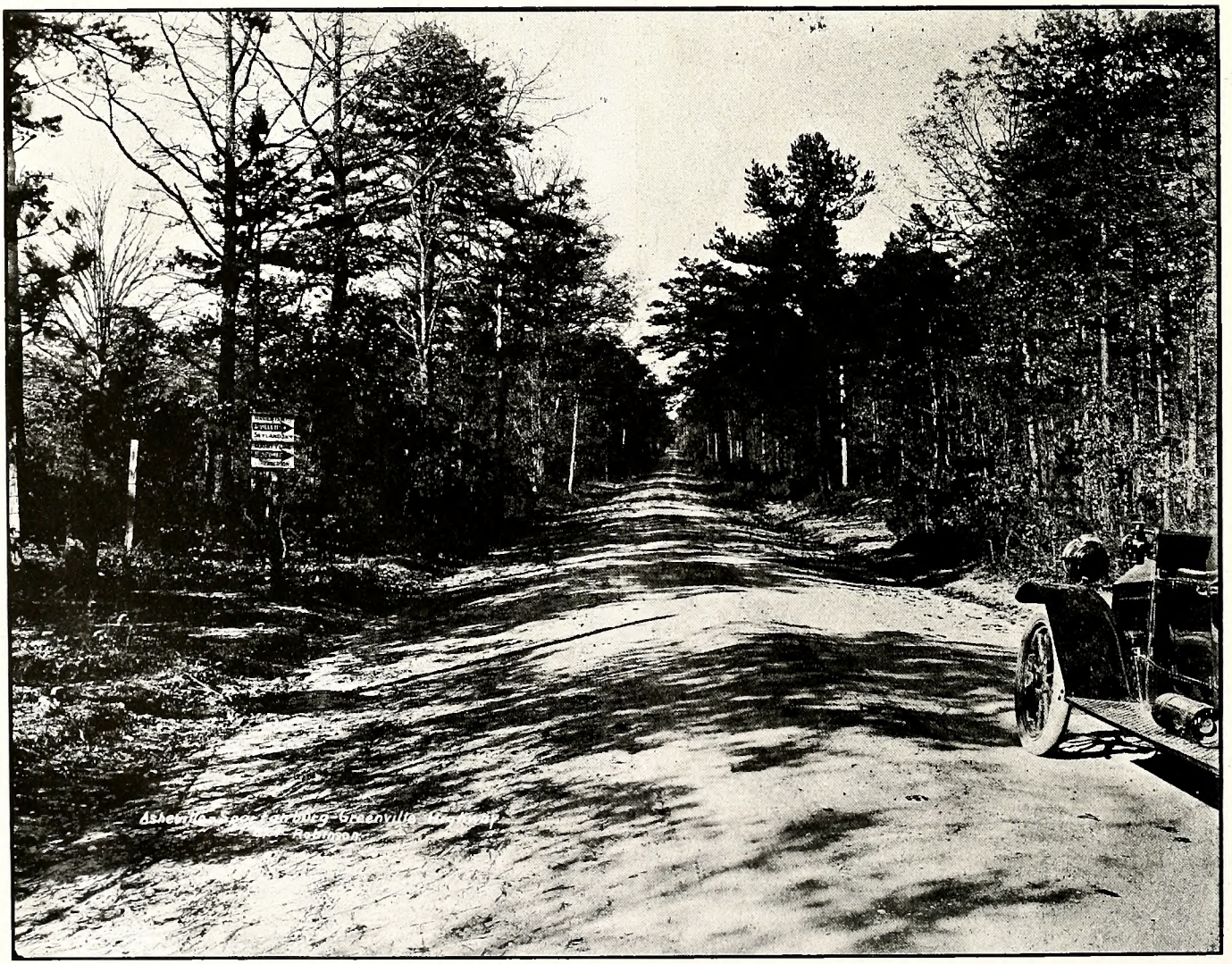
Evidence as to Pavements.

Several million yards of Trinidad and Bermudez sheet asphalt pavements that have given a service of twenty years or more are illustrated and described in a booklet entitled "Evidence" just published by The Barber Asphalt Paving Company. A score of cities are represented and wherever maintenance data was obtainable it has been given along with the date the pavement was laid and a photograph showing its present condition. The oldest of the pavements so described is the Trinidad sheet asphalt pavement on Vermont Avenue, Washington, D. C. It is 35 years old. Something more than 1,000,000 square yards of asphalt paving in Washington, D. C., averaging 23 years of age has cost 1.8 cents per yard per year for maintenance. New Orleans has several 30 year old pavements. Buffalo has 1,200,800 yards of sheet asphalt 20 years of age or more and still in use. Among other cities that contribute to the census of more-than-20-year-old pavements are New York, Philadelphia, Boston, Chicago, St. Louis, Cincinnati, Columbus, Detroit, Omaha, Charleston, S. C., Savannah and Louisville.

Poul Lindholm, Engineer of Highways, Copenhagen, Denmark, has been awarded the Traveling Fellowship of the American Scandinavian Foundation for 1915-1916. He will devote the year to graduate work in Highway Engineering at Columbia University.

The commissioners of Buncombe county, N. C., have let contracts for six steel bridges, aggregating $8,905.

Charleston county, S. C., has contracted for a bridge across Stono river to cost $9,000.



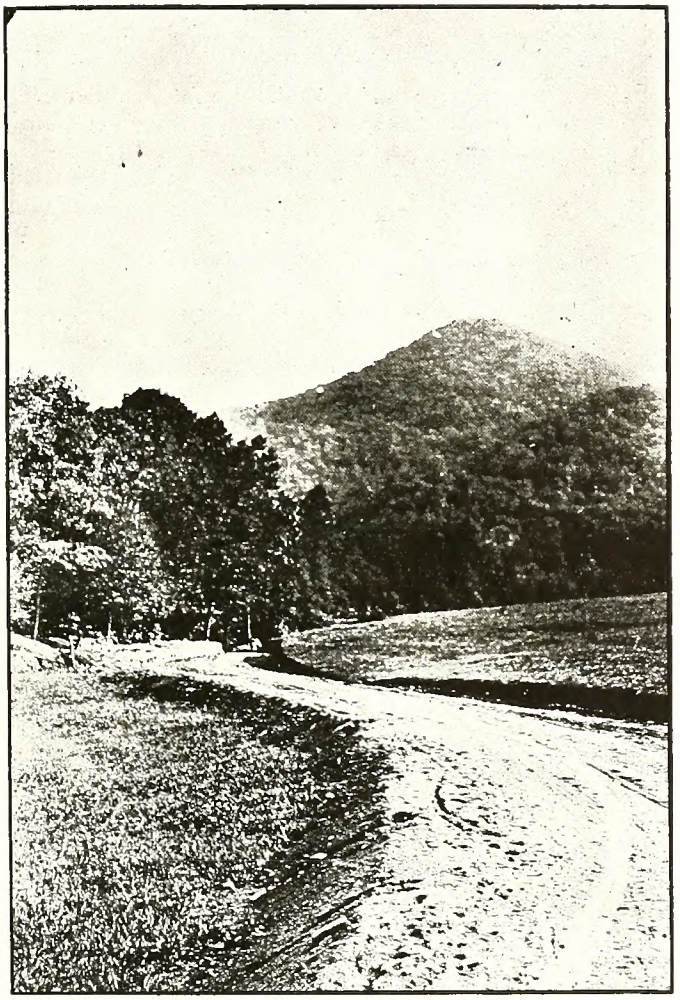
Sand Clay Road on the Asheville-Spartanburg Highway. The Picture Was Taken at the Buncombe-Henderson County Line, Looking Toward Asheville

Land of the Sky Highways

By N. BUCKNER

Secretary Asheville Board of Trade

"A definite system of roads; start from somewhere, go to somewhere." This is the slogan of the good road enthusiasts of Asheville and Buncombe county. In fact, there is practically a solidarity of this idea

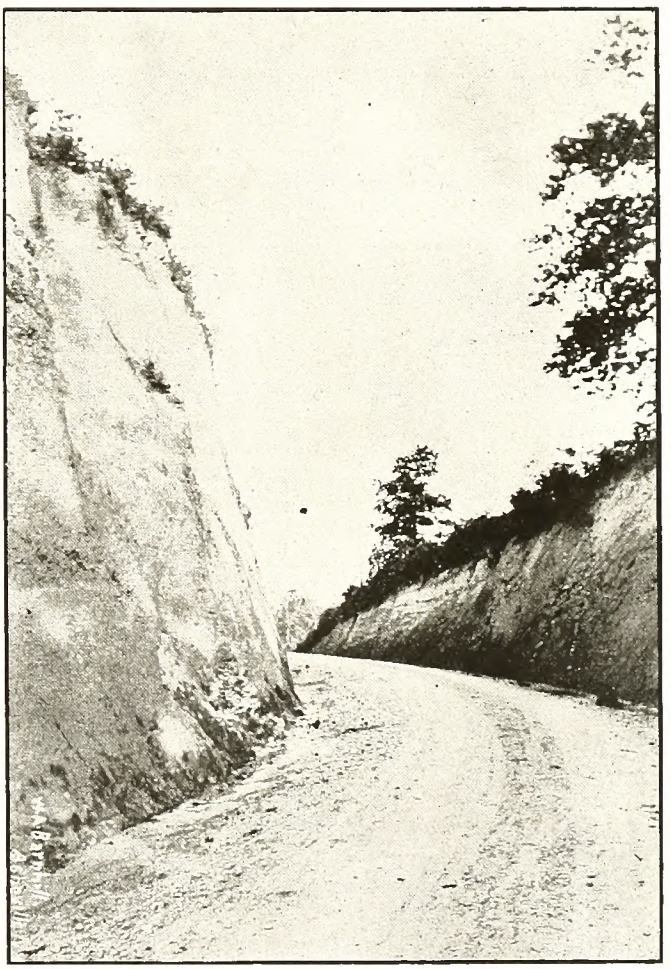


At the Foot of Hickory Nut Mountain, Looking Toward Hickory Nut Gap

throughout every community in all of Western North Carolina, "Land of the Sky."

Four great highways from Asheville to the Atlanta Highway east are open for motor travel now, and the Central, or Southern National Highway, from Asheville west to Newport, Morristown, Knoxville and the great west and northwest, is nearing completion as rapidly as men, money and machinery can build the road through this rugged mountain canyon along the rapidly flowing French Broad River. Up to within a year ago there was but one highway into this beautiful mountain region of western North Carolina, Asheville to Greenville. The three opened in the past year are the Asheville-Charlotte Highway through Hickory Nut Gap via Chimney Rock and Rutherfordton and Shelby; Asheville-Spartanburg Highway via Hendersonville, Flat Rock, Saluda Mountain and Tryon; and the Central, also Southern National Highway, east via Black Mountain, Round Knob, Marion, Hickory and Statesville to Salisbury. The scenery through Hickory Nut Gap and Chimney Rock, via Round Knob, and across Saluda Mountain is especially beautiful and pleasing to the eye, while the roads are in excellent shape, as well as across Paris Mountain to Greenville, S. C.

There are nearly a hundred miles of macadam and sand-clay roads leading out of Asheville to all points in Buncombe county, making easy access to all communities. At present the county is building an asphalt macadam road from Asheville to near Weaverville nearly seven miles in length. The county is furnishing the stone foundation ready for the work of the contractors, the Crinkly Construction Co., of Harriman, Tenn., to place on the asphalt macadam surface. The foundation is four inch minimum, crown $\frac{5}{8}$ inch to foot; asphalt surface made up of one yard of stone, 3-4

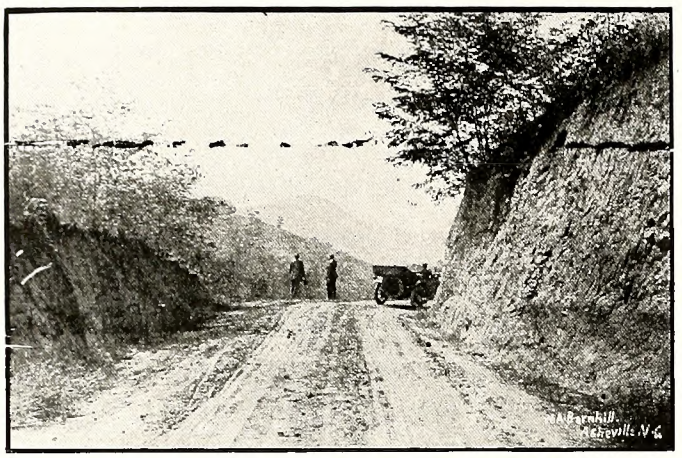


Big Cut through Mine Hole Gap in Buncombe County, on the Asheville-Charlotte Highway

inch and under, to 21 gallons heated asphalt thoroughly mixed, spread and rolled to $2\frac{3}{4}$ inches in thickness. Asphalt portion is 16 feet wide with two feet of water-bound macadam on each side. Road underdrained at all points. This and other road work of the county is

being done under the supervision of County Road Engineer, Charles H. Neal. The total cost of this piece of road will be about $50,000.

The value to a community or section of good roads is inestimable, and the great highways recently opened



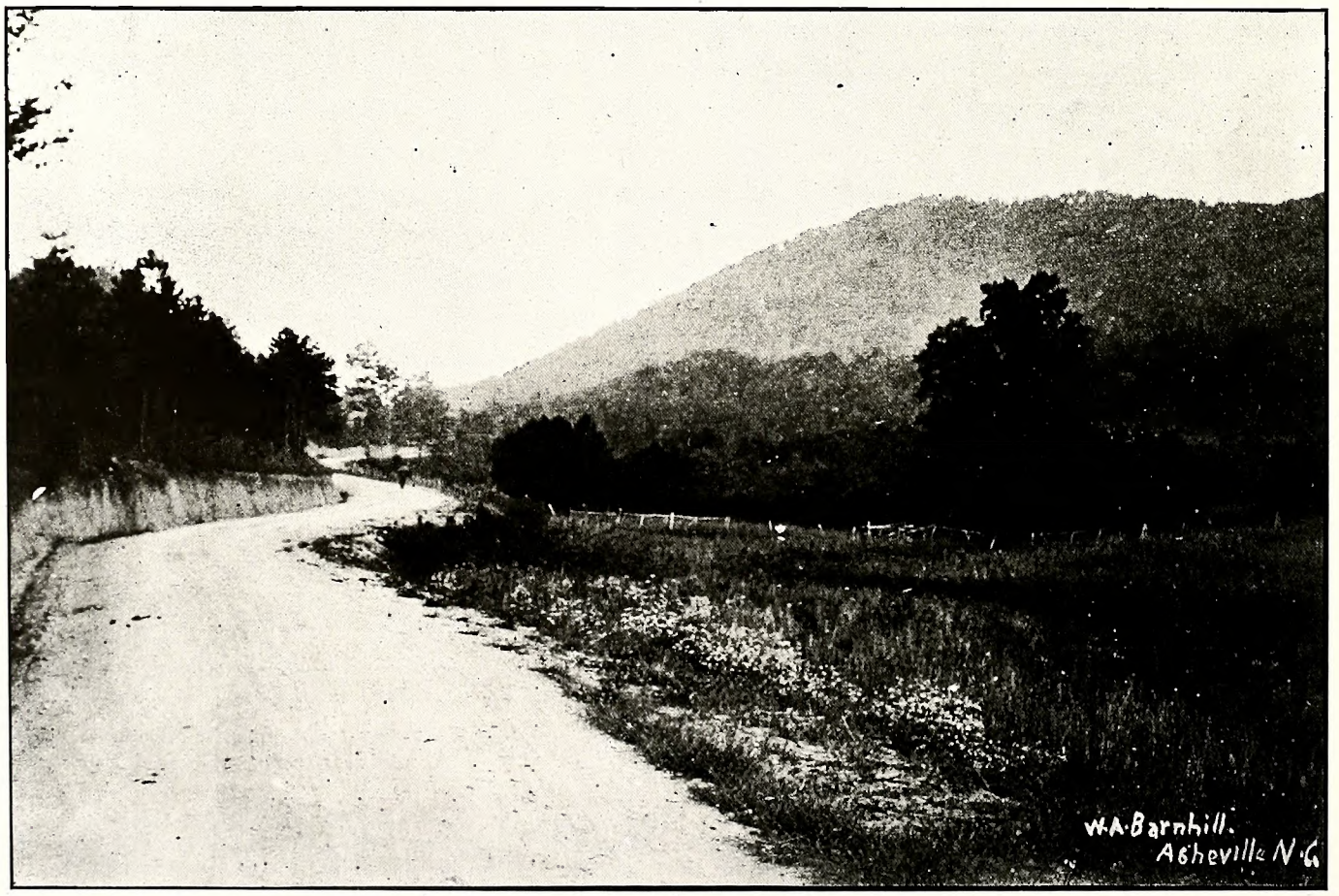
Sand Clay Road between Asheville and Waynesville

up into Asheville is already proving a great attraction to motoring tourists who are coming to Asheville in their cars due to these excellent roads and the splendid mountain scenery along them. Here within a hundred miles of Asheville is located the high altitude area of eastern America with forty-four mountains higher than 6,000 feet, and twenty-three of them higher than Mt. Washington of New Hampshire, 6290 feet, up to about twenty-five years ago heralded as the highest mountain in the east. Mt. Mitchell, 6,711 feet, King of Eastern Peaks, is within almost a dozen miles of Black Mountain, on the Central, also Southern National Highway, while the Pisgah Motor road into the heart of the Appalachian National Park, carries the motoring tourist to Pisgah Lodge, the home of Mrs. George Vanderbilt, 5200 feet above sea level, and to within forty-five minutes by trail of Mt. Pisgah, 5749 feet altitude. It is expected a great many good roads enthusiasts will motor to Asheville for the North Carolina Good Roads Convention which meets in Asheville July 14-15-16, 1915, where a warm welcome awaits them.

Annual Meeting National Paving Brick Manufacturers' Association.

The Board of Directors of the National Paving Brick Manufacturers' Association at their quarterly meeting held in Cleveland May 27th affirmed arrangements tentatively made for holding its annual meeting October 11-12 at Dayton, Ohio. During this week, namely October 12-13-14, will be held the annual meeting of the American Society of Municipal Improvements. This arrangement will not only enable the members of the National Paving Brick Manufacturers Association to attend the meeting of the American Society but it will also give the engineers of Ohio, Indiana and Kentucky and other states who have not heretofore been members of the American Society of Municipal Improvements an opportunity to attend that meeting and become enlisted in its roll of membership. There should be no absentee.

The town of Cartersvlle, Ga., will vote this month on a bond issue of $15,000 for street work.



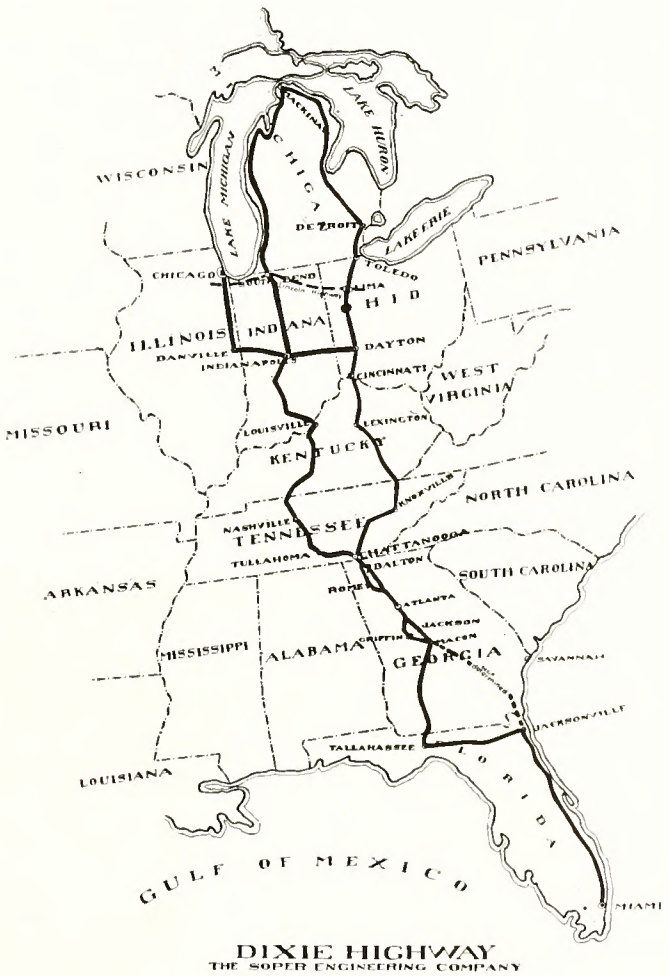
Approaching Mine Hole Gap, Asheville-Charlotte Highway. Macadam Road in Buncombe County, N. C.

A Dixie Highway System

By HAL F. WILTSE

Chamber of Commerce, Chattanooga, Tenn.

A "DIXIE HIGHWAY SYSTEM," rather than a single Dixie Highway, is the result of the great movement inaugurated by C. G. Fisher, of Chicago, Indianapolis and Miami, and W. S. Gilbreath, secretary of the Hoosier Motor Club, Indianapolis, and placed on a firm foundation largely through activity of the Chattanooga Automobile Club. While there are some who maintain that a single highway like a one track railroad system—would have been better in many ways, there is on the whole nothing but optimism. The promoters believe that great arteries of traffic will be speedily created by construction of new roads and improvement of existing roads, from Chicago to Miami,



the original course, and further north now that Michigan has been admitted to the north and south highway system.

It will be seen by those who are familiar with great road building projects, therefore, that the Dixie Highway plan differs from that adopted for the Lincoln Highway. The latter is a single road from the Atlantic to the Pacific. The Dixie Highway system, along certain stretches, will have an eastern and western route, so as to serve two important sections of country. This will afford tourists the opportunity of either taking their choice for the run south, or, if they desire, to follow the same general course on the return trip, take a different route and enjoy greater diversity of scenery, historic places, and other attractions.

Why this difference in the manner of designating the Dixie Highway, is a question that will occur to many. It may be charged principally to the difference in the method of arriving at a decision. In the instance of the Lincoln Highway, the great trans-continental road was laid out by a group of men using, in the main, the judgment of engineers without regard to the preference of communities along possible routes. The road was announced, possibly, before the country as a whole or in part knew much about its projection. As for the Dixie Highway, three points were designated—Chicago, Chattanooga and Miami. Further, it was practically conceded that Louisville, Nashville, Atlanta and Jacksonville would be touched. With these premises as a basis, the entire population along the streteh of country outlined by these cities was invited to enter a competition for the official route. That competition developed a degree of heat and enthusiasm which probably no one interested in the project dared hope, or for a moment anticipated. Against Louisville, the splendid cities of Cincinnati, Ohio, and Lexington, Ky., entered the lists in behalf of a more direct route that would include their communities by leaving out Louisville. In Tennessee, two proposed routes developed, both leaving out Nashville. In North Georgia, the Dalton, or Johnson-Sherman route of memorable history, faced strong opposition on the part of Rome and smaller communities, this group seeking designation of a route which would leave out Dalton. Further south in the Cracker State another contest developed.

From these circumstances it will be seen that the fourteen route commissioners, two from each of the seven states as named by the governors thereof, were "up against it," or would have been if limited to the selection of one through road. But they were not. In consequence, it is plain that they perceived the tremendous value to the general development of southern roads of keeping up the keen competition by creation of a road system which embraced practically all the contestants. This course gives equal recognition to all the rival routes, and incidentally places them under the same obligation to carry out their pledges, on penalty of falling from the good graces of the Dixie Highway Association.

A clear idea of the situation is available from a little study of the accompanying map which shows only the roads which bear the official stamp of the Dixie Highway Association.

Decision of the route commissioners was reached at Chattanooga May 22 after more than two days spent in listening to arguments presented by some of the most eloquent men from the states interested. These spokesman were backed by large delegations from their respective communities, varying as to size in proportion to the distanee they had to travel and the degree of anxiety each felt about possible success of a rival. In describing the meeting of May 20 and 21, it would be easy and not unwarranted to indulge in strong superlatives. But here is what the associated press special representative assigned to cover the meeting for that great news gathering association said to Clark Howell, editor of the Atlanta Constitution and chair-

man of the route commission: "I feel that I have not told half, but when the people of the United States read what I have sent out, they may think I have exaggerated." Men of experience in such matters, like A. G. Batchelder, of the American Automobile Association; Carl G. Fisher, identified with the Lincoln Highway; Coleman DuPont, father of good roads in Delaware; and many others said that the meeting in Chattanooga April 3 on the Dixie Highway project exceeded anything of the kind they had ever seen or expected to see. The meeting in May was fully as large and more earnest, because the rivals had had time to muster their forces and prepare themselves with information of every imaginable kind to strengthen their claims for the great prize. Every state of a chain from the lakes to the gulf was represented—literally, because Michigan shortly before the meeting trained its guns on the authorities in the effort to get the highway extended north of Chicago. The states, therefore, which had delegations were Michigan, Illinois, Indiana, Ohio, Kentucky, Tennessee, Georgia and Florida.

In measuring the proportions and enthusiasm of this meeting, one fact should be well considered. Every contesting route had filed with each of the fourteen commissioners, prior to May 10, a written brief coupled with maps and whatever other exhibits they chose, presenting their case fully and elaborately, along lines established by the commission at its meeting in Louisville April 23.

So it is seen that not all all the hotly contested campaigns this spring and early summer have been waged in Europe. The two "Battles of Chattanooga" for the Dixie Highway (April 3 and May 20-21) will go down in the history of national development as of great and far reaching importance. Much of the Dixie Highway will pass through country that was torn to shreds in the Civil War and now is marked for all time to come in memory of the bravery of Americans. The Dixie Highway will serve, as was brought out by many speakers, as the strongest link reuniting the north and south, bringing them into better fellowship through better intercommunication. Memories of the past, and predictions of better conditions for the future, are bound up inseparably in the thought of the Dixie Highway, the North to South Peace Way, connecting with the Lincoln Highway near Chicago!

Formal announcement of the commissioners conclusion regarding designation of the Dixie Highway system was made public in a statement issued by Chairman Clark Howell and indorsed by his colleagues, text of which is here reproduced:

"The commission adopted the circle arrangement largely upon the suggestion of Carl Fisher, of Indianapolis, who originally suggested the Dixie Highway movement, and who was a prime mover in the Lincoln Highway. It was done largely to meet the condition created in the applications of Louisville and Nashville on the one side and Cincinnati and Knoxville on the other. Both were full of enthusiasm, and as their interests in nowise conflicted, as they were in entirely different sections, it was the unanimous judgment of the commission that it was best to take advantage of this opportunity to get two great routes centering at Chattanooga. The one, via Knoxville and Cincinnati, would traverse the state of Ohio and connect with Western New York and Western Pennsylvania. The other, via Nashville and Louisville, would reach direct to Chicago and appeal to the demand for connection from Indiana, Michigan, Illinois and the middle west.

"This circle will, in due time, take in the Florida peninsula (just as has been provided for in the Michigan peninsula) making a grand loop around the Michigan lakes just as it will between the Atlantic and the Gulf in Florida." The route, as selected, follows:

"West Route—Chicago, Momence, Watseka, Hopestown, Danville, Ill.; Covington, Crawfordsville, Indianapolis, Martinsville, Bloomington, Bedford, Paoli, Ind.; Louisville, West Point, Elizabethtown, Cave City, Bowling Green, Russellville, Ky.; Springfield, Nashville, Murfreesboro, Shelbyville, Sewanee, Mont Eagle, Chattanooga, Tenn.; LaFayette, Summerville, Rome, Cartersville, Atlanta, Jonesboro, Griffin, Barnesville, Macon, Americus, Albany, Thomasville, Ga.; Tallahassee, Live Oak, Lake City, Jacksonville, St. Augustine, Palm Beach, Miami, Fla.

"East Route—(Joining West Route at Indianapolis)—Richmond, Ind.; Dayton, Cincinnati, Ohio; Covington, Williamstown, Georgetown, Lexington, Richmond, Cumberland Gap, Ky.; Knoxville, Rockwood, Dayton, Chattanooga, Tenn.; Dalton, Calhoun, Atlanta, McDonough, Jackson, Macon, Ga.; (East Route from Macon to Jacksonville to be selected later.)"

It may be said parenthetically that C. E. James, president of the Dixie Highway Association, favored the highway system. He addressed a communication to all the commissioners, before their decision was reached, opening with these words: "The Dixie Highway ought to be a system and not one route." The remainder of Mr. James' plea was local, outlining what he thought should be done in Tennessee, Kentucky and Georgia.

Adjournment of the commissioners' three days' session was immediately followed by a meeting of the incorporators—C. E. James, W. R. Long, C. H. Huston, John A. Patten, Morris E. Temple, Thomas R. Preston and Richard Hardy, all of Chattanooga—over which Clark Howell, of Atlanta presided. A charter granting under two different Tennessee laws—the public welfare act and special highway association act—was adopted by the twenty-one directors and permanent organization completed as follows: President, C. E. James, Chattanooga. Vice-Presidents, M. M. Allison, Tennessee; Harry L. Gordon, Ohio; Thomas Taggart, Indiana; W. T. Anderson, Georgia; G. W. Saxon, Florida; H. B. Hanger, Kentucky. Secretary-Treasurer, William R. Long, Chattanooga. Field Secretary, W. S. Gilbreath, Indianapolis. Executive Committee, President, James and Secretary Long, Chattanooga; Carl G. Fisher, Indiana; Richard Hardy, Chattanooga; Clark Howell, Atlanta.

Resolutions adopted provide that the various lines of the Dixie Highway system must be completed within a year from May 22, and it was proposed that the highway be dedicated next November, probably Thanksgiving day. Text of the resolution follows:

"Whereas, The Dixie Highway has been this day located by the commissioners appointed for that purpose, said commissioners in so locating said highway having relied upon the statements, promises and guarantees of the various localities through which it runs in regard to constructing and maintaining said highway, be it

"Resolved, That notice be and is hereby given to each county and municipality through which said highway has been designated that said highway must be completely constructed to the satisfaction of the commissioners and in accordance with the specifications to be hereafter adopted within twelve months from this date, and be it further

"Resolved, That the said commissioners reserve the right to change the location of said highway or any

part thereof should the same not be completed at the time and in the manner herein before provided, hereby calling attention to the fact that the failure of any county or municipality to so construct, complete and maintain said highway will be sufficient cause to authorize said commissioners to change the location of said highway, and be it further.

"Resolved, That a copy of this resolution be furnished each county and municipality for their information and guidance."

The state of Michigan was admitted to the Dixie highway movement and a loop road was designated along Lake Huron and Lake Michigan, beginning on the eastern line at Toledo, thence to Detroit, Saginnaw, Bay City, Straights of Mackinac (the farthest point north) and down to South Bend over the already completed West Michigan Pike.

Carl G. Fisher, one of the Indiana route commissioners, and William W. Marr, secretary of the commission, were appointed as a committee to draft specifications for the construction and classification of the various lines in the designated system. The committee was instructed to report to the executive committee, which will approve the specifications and forward them to the counties traversed by all the lines.

A resolution introduced by Commissioner Harris, of Cincinnati, recommended to the directors that construction of branch roads connecting with the main highway be encouraged. It was also recommended that each state not now represented, but which builds acceptable lateral roads, be permitted to name two directors in the association. These recommendations were adopted.

Baton Rouge, La., has contracted for twelve miles of street paving at a cost of $200,000, and eleven miles of gravel streets, with asphalt binder at $150,000. Also, the city has contracted for 20,000 yards of fibre brick paving at a cost of $50,000, making a total expenditure of $400,000 for streets.

Osceola county, Fla., is asking for bids on a two mile stretch of brick highway. The estimated expenditure is about $35,000.

To enliven the May 20-22 Meeting of the Dixie Highway route commission and delegations from competing routes, the Chattanooga Automobile Club put on a night automobile parade, offering two cups as prizes. Dalton, Ga., won the cup for delegation entering the largest number of machines in the parade. W. B. Bender's coupe, decorated as a "peace car," won the cup for the best decorated machine. W. O. Jones' car received honorable mention. There were about 1000 automobiles all told in the parade, many of which were decorated

Gravel and Its Uses in Highway Construction

By HON. PAUL D. SARGENT

Chief Engineer, State Highway Commission of Maine

THE writer believes that no one material used in highway construetion lends itself to so many and varied uses as gravel. At first thought comes to our minds the use of gravel as a surfacing material, but upon refleetion we recall that gravel is often used to strengthen a weak foundation under a stone or other improved surface; it is also used for shoulders of roads having a more expensive surface; it may also be used for constructing underdrains, both with and without pipe; and very often we find it advisable to use gravel as an aggregate for concrete for culverts and concrete ends for pipe culverts and it is frequently used for the aggregate in conerete for foundations, piers and abutments under steel bridges; in all parts of the construction of reinforced concrete bridges and during the last few years gravel has been extensively employed as an aggregate in concrete for road surfaces; it is also used in connection with bituminous surface treatments of roads; and has been used in the construction of bituminous conerete surfaces.

It has been the writer's observation that outside of the engineering profesison the term gravel has not been very carefully used. Laymen and others who think in general terms often refer to any material containing from twenty per cent up of grit or sand as gravel and in ordinary country road work this leads to considerable confusion, and many a disapointment. It may be well to look at a few definitions of gravel as given by various authors. In the Cyclopedia of civil engineering we find the following:

"Gravel consist of pebbles of various sizes produced from stones whieh have been broken up and then worn smooth with rounded corners. The very faet that they have been exposed for indefinite periods to atmospherie disintegration and meehanical wear is a proof of the durability and meehanieal strength of the stone."

Baker in his "Roads and Pavements" defines gravel "as a mass of small more or less rounded fragments of stone which have been broken out and shaped by the action of water or of iee."

These definitions describe substantially the same material but are not speeifie and definite as to size. In this particular the writer likes the definition given by Professors Blanchard and Drowne: "Gravel eonsists of small pieces of roek worn smooth by abrasive action which would be retained on a 4-mesh sieve." If we add the final elause in the last definition to that given by Baker, I would eonsider it the most satisfactory definition I have seen.

In my experience I have found several deposits of gravel whieh are decidedly angular and not very smooth. Needless to say gravel of these characteristics, if hard, can be used in practieally every eonstruction work where ordinarily crushed stone of a first quality would be speeified.

An examination of the text book on highway engineering by Professors Blanchard and Drowne indicates that the general range of gravel deposits and their sourees has been well covered and I shall not toueh on that point. I do wish to call attention to one fact to substantiate in a praetieal way the statement therein made. An investigation of improved roads throughout the United States made by the office of public roads of the U. S. Department of Agrieulture in 1909 disclosel the fact that gravel surfaced roads were found in every state; let me add right here that this was the only type of improved road that was so generally found.

Some of you at least are probably familiar with what are termed natural gravel roads. These are found in many parts of New England on what are termed locally as "horsebacks." These horsebacks are gravel ridges and the geologist calls them eskers.

If you know these roads you know the best natural roads in existence. Always dry and more or less smooth and hard, depending upon the characteristics of the gravel. I call to mind roads of this kind that I have known for thirty years and I doubt if in all that time thirty dollars per mile has been expended upon them and they are always first-elass, although not subjeeted to an extremely heavy traffic. The point I want to bring out is this: If all materials suitable for use in all parts of a good road were equally available and I was limited to the use of only one material I would select gravel.

Let us now see in detail how gravel ean be used in highway construction. Taking up in logical order the several items in conneetion with improved road work we come first to a consideration of drainage structures. We will probably all agree that if only one type of construetion were to be adopted for drainage structures, regardless of all considerations, exeept permancy and durability, we would select concrete, either plain or reinforced.

Plain concrete has been successfully used for small drainage structures, that is, pipe culverts, in the vicinity of South Bend, Indiana, since the early 70's. In 1871 the manufacture of cement pipe was started there and a gravel aggregate was used. A few years ago many pipes which had been laid for years were dug up and found to be in perfect eondition. Many machines are on the market for moulding concrete tile and in some parts of the country their use is very general for small culverts.

The other extreme in the use of plain eoncrete in bridge work to which I want to call your attention is Connecticut Avenue Bridge over Rock Creek, Washington, D. C. This bridge when built was the largest eonerete bridge in the world without steel reinforcement. There are five principal arches, haying spans of 150 feet. The highest point of the bridge above the gorge is 150 feet. The total length between abutments is 1341 feet.

Between these two extremes the imagination can see the possibilities of conerete for culverts and bridges of almost any span or height. It is unnecessary for me to go further into details. A quotation from Turneaure and Maurer in their Principles of Reinforeed Concrete will serve to show my purpose.

In discussing the properties of concrete they make the following statement with respect to broken stone and gravel:

"Both materials are satisfactory *** Gravel may be

sufficiently uniform in quality so that the sand need not be removed, but it will usually require screening in order to insure a concrete of definite proportions. *** The crushing strength of a gravel concrete is usually a little less than one of broken stone of the same proportion of voids but the difference is unimportant. The difference in tensile strength is not well determined, but the few tests available indicate about the same difference as in compression strength." This statement is found immediately following this introductory paragraph:

"The conditions to be met in reinforced-concrete construction require the use, generally, of a concrete of relatively high grade. In this type of construction the strength of the material is of much greater importance than it is in many forms of plain concrete design, as the dimensions of the structures are more directly dependent upon strength and less upon weight. A comparatively strong concrete is therefore found to be economical."

Similar statements are found in other treatises on reinforced concrete. It would seem perfectly safe to assert then that gravel of proper quality, size and grading could be used as an aggregate in the construction of all highway drainage structures where it is possible to use concrete.

Next in order we come to a consideration of foundations. In nearly all branches of construction work engineers recognize gravel as a satifactory foundation. This, of course, might not be true in the case of foundations for extremely massive structures like sky scraper buildings or certain dams or extremely large highway or railroad bridges; in ordinary cases, though, I believe the statement is correct. The safe loads per square foot specified by Professor William H. Burr, M. Am. Soc. C. E., in structural work on foundations composed of different materials bears out this statement. He gives the following:

Well-drained clay practically dry..8000 to 12000 lbs.
Clay moderately dry.....4000 to 8000 lbs.
Soft, moist clay.....2000 to 4000 lbs.
Coarse sand or gravel in undisturbed
and well-bonded strata.....12000 to 18000 lbs.
Thoroughly compacted and bonded
ordinary sand well held in place..4000 to 8000 lbs.

It has long been the practice in Massachusetts State highway work to construct macadam as thin as four inches over a well drained natural gravel or sand foundation.

It is other natural foundations, then, such as clay loam, marl or peat and muck which will give the highway engineer more or less trouble when they are encountered. It is not my purpose to discuss the characteristics of these various soils; you are already familiar with them.

A fundamental principle in all road construction is that we must have a well drained foundation. This is usually obtained by laying a pipe drain on one or both sides of the road or sometimes in the middle of the road and filling the pipe to the surface with sand, gravel or crushed stone—some porous material. Nothing is better for this purpose than gravel using a fairly coarse size, say, such as will pass a three-inch ring and be retained on an inch ring. The pipe, of course, should be surrounded by finer material. It is possible to construct drains which will be fairly satisfactory without the use of pipe by using still coarser stone in the bottom of the trench. I have seen very bad miry conditions in clay roads cured by making a trench three feet deep and 18 inches wide in the side of the road from which the water came and filling the same with clean gravel without any particular care as to sizes. This was not done on an engineer's specifications but was an original idea with a country road commissioner.

You are undoubtedly familiar with the "V" drain foundation which has almost entirely superseded drains of the type just described where stone is plentiful. Briefly, the foundation is constructed by excavating the roadway for its full width to a depth below subgrade of 4 to 8 inches at the sides and from 12 to 18 inches at the center and refilling the excavation with field stone or ledge fragments. The usual specification calls for stone not larger than 8 inches in any diameter, this to be placed in the bottom and the stone to diminish in size toward the top until a layer of stone about two inches in diameter is spread over the top of the drain.

In my experience locations have been encountered where we have specified "V" drains but where stone was not easily available and gravel has been substituted with perfect success.

Again, weak and more or less yielding foundation can often be strengthened by placing thereon a layer of gravel. Many times this treatment can be given a road foundation where otherwise Telford base might be resorted to. Better results will be obtained, however, in cases of this kind by using a little more material and taking the time and trouble to place the gravel as described above for the "V" drain.

This method of strengthening weak foundations is referred to in the specifications of several state highway departments which I have seen.

At one time it was the practice in Massachusetts to put two inches of gravel under the Telford where very heavy soil was encountered. Again when sand or other material of such a nature as to push along in a wave in front of the roller is encountered in the preparation of the foundation or subgrade a thin layer of gravel strewn over the surface will enable the roller to consolidate the road bed. For use in drainage and foundation it will not be necessary to have such a good quality of gravel as for concrete or surface work.

In closing this discussion of the use of gravel in drainage and foundations I want to bring to your attention one thought which is applicable in all road work, viz: Underdrainage and foundation work costs nothing for maintenance and decreases the construction and maintenance costs of any type of surface.

Gravel on account of being less expensive is often used to surface the shoulders of a macadam or other type of road and thereby increase the width of road which may be used by meeting and passing traffic without proportionately increasing the cost of the road.

We next come to the consideration of gravel as a surfacing material.

All authorities agree that gravel to be suitable for road surfacing purposes should meet the following requirements. The fragments should be so hard and tough as not readily to disintegrate under traffic; they should be so proportioned as to size that the voids will be a minimum; they should be intermixed with some binding or cementing material to hold them in place.

The hardness and toughness of gravel varies greatly, as do these two properties of stone. The very nature of the origin of gravel, however, may be taken as more or less of a guarantee of its durability since the softer and more friable fragments have been worn away while being transported and deposited. Ordinarily gravel is not considered equal to the best crushed stone for road surfacing. I have in mind some gravel roads which very closely resemble trap rock waterbound macadam and have proved to be very durable and lasting

under medium country traffic. These are some of the principal thoroughfares of my home county of Washington, Maine. I have in mind another considerable stretch of gravel road built by the city of Augusta, Maine, in 1907, on one of the heaviest traveled thoroughfares leading into the city. About two miles of this surface was laid from the city line towards the city. The next year the road was completed from the end of the gravel into the city proper using crushed boulders and field stone, principally granite. Neither road has been resurfaced or received any maintenance except the gravel surface has usually been shaped with a split-log drag in the spring. Today the gravel road is practically as good as it was when it was built, while the macadam is almost entirely worn out. Five other thoroughfares leading out of the city were reconstructed at the same time and all were surfaced with water-bound macadam like that described above. All have needed resurfacing for the last three years and today they must be thoroughly reconstructed before they will be satisfactory for traffic. On account of this experience nine out of ten people who use these roads give it as their judgment that gravel is by far the better and most enduring surfacing material. I saw these roads when under construction and was in the pit several times from which the gravel was taken. It was a fine, rather clean material. No analysis of the material has been made to my knowledge, but I should say that it would all pass a screen having ¾ inch circular openings. This surface was laid in two courses, the first 4 inches deep after rolling and the second 4 inches deep after rolling. I am not aware that measurements have been taken to ascertain the wear on this gravel surface. I expect, however, that the wear will prove to be nearly equal to that on the macadam adjoining it, but on account of the absence of large pebbles throughout the surface the wear is not noticeable.

The pit from which this gravel came was very easily worked. It was not necessary to pick or loosen any of the material. I had grave doubts at the time as to securing a satisfactory surface from its use on account of the fineness of the material.

Ordinarily we expect a gravel which stands in a vertical face in a pit and has to be loosened, to make a good road surface and I do not know of any instance where such gravel has not made a good surface. In some sections of my state the only available gravel comes from the beds of streams. In many places along the sea coast beach gravel is used. Generally speaking, this is the least desirable of all as it is usually worn very smooth by its constant movement as the result of wave action.

For sizes I prefer about the same as I would specify for water-bound macadam—viz: For the bottom course, stones that will be retained on the 1¼ inch opening and pass the 2½ inch opening; for the second course, stone that will be retained on the 2½ or ¾ inch opening, and will pass the 1¼ inch opening. That passing the ½ or ¾ inch opening I would use for binding the two courses of the road.

What I have said about the gravel used in the road in Augusta will show you that the success of the work does not always depend upon the sizes of the material.

It is not necessary always to go to the expense of screening. With a good foreman in the pit and a good foreman on the road it will be possible to get the material out of different parts of the pit, especially if the gravel lies in strata of different-sized pebbles as is the case frequently, so that it will be sized substantially as specified. I have one superintendent who has worked pits in this way and he always gets a good road. This man says there is a place in the road for everything that comes out of the pit and he finds it. The strippings are used on the shoulders, to raise grades or widen banks. Material too large for the bottom course goes to make an extra course which serves as a foundation in low or muddy spots. Sometimes this is used in "V" drain work.

The binding material found in, or added to gravel, may be clay, loam, iron oxide, silica or stone dust resulting from the crushing under traffic or rolling of certain ingredients in the gravel. Theoretically the best gravel, other things being equal, would be one in which the interstices between two particles, the same size, were filled with particles of a smaller size, until there were the minimum amount of voids. Of course, in practice this condition is never fulfilled. Many gravels, however, do contain the right amount of binding material and can be used without manipulation except the customary care in the spreading, rolling, etc. In case too much binder is present it must be screened out; if not enough is present, binder must be added. This is a matter that requires careful attention. My experience has been that most road builders are too anxious for a gravel road to bind quickly. An excess of binder, especially if of a clayey nature, will result in a muddy road during a protracted wet spell, or when the frost is coming out in the spring.

I have seen roads surfaced with a clean gravel, comparatively free from binding material which after a few months traffic would bind, due undoubtedly to the crushing under traffic of some part of the gravel, or to the wearing off of fine dust which worked into the surface and acted as a binder.

On the beach at Eastport, Maine, for several years we have secured a gravel quite angular and cubical in shape, each particle of which is covered with a thin film of binding material of a brick-red color. This makes as fine a road as it is possible to construct. This material has not been analyzed to determine the character of the binder, but I expect it is clay.

We have built some gravel roads which have not consolidated even under six months of traffic. These roads have been bound by spreading uniformly over them about one inch of clay broken into small particles, and then harrowing the clay into the gravel. As stated above the tendency of the ordinary road builder is to use to much binder when it has to be added. My experience shows that 16 to 20 per cent by volume is sufficient and I prefer 16 rather than 20 per cent. I once observed the following illustration of the binding effect of clay when used with clean gravel. A sidewalk had been surfaced with clean gravel! I noticed that the only places where the gravel was bound was where a clay cutting had been made and clay had washed off the slope into and upon the gravel surface, although the walk had been laid several months.

While speaking of binding gravel I want to mention a statement made to me by the superintendent of a public park. I noticed a good gravel walk on about an 8 per cent grade which did not wash during heavy showers or protracted rains. I inquired from the superintendent regarding the construction of the walk. He stated that the gravel was bound with clay and rock salt, but I have never been able to learn the proportions of either used. Undoubtedly the delinquescent property of the salt may have had something to do with keeping the surface of the walk in good condition.

A quick method of examining gravel is to place a representative sample in a jar or glass vessel and cover with water and stir briskly for several minutes. As the mass comes to rest the heavier and coarser particles

will settle first and the finer binding material will be precipitated last. A simple inspection or better yet a measurement will give the approximate proportions of the different sized particles.

I am not aware that any satisfactory tests for determining the suitability of a gravel for road purposes have been devised. An investigation of the matter was started about a year ago in the Office of Public Roads, but has not been completed. I know of one gravel that was sent to the laboratory there and passed upon as not being satisfactory gravel for road purposes which was afterwards used as it was the only material available and which has made a fairly satisfactory surface. I am willing to confess that I hesitate to say that a gravel will or will not prove successful. I always ask to be shown a section of road upon which the gravel has been used if the pit is one from which the material has been taken before. In my judgment at the present time this is about the only satifactory method of determining the suitability of a gravel for suface work.

During the last few yars considerable interest has been manifested by highway engineers in the use of Portland cement concrete as a surface both for country highways and for city streets. As in other forms of concrete, gravel has been largely employed as an aggregate for this purpose and when proper precautions have been taken to secure hard pebbles well graded and clean good results have followed.

We are also aware that in the varions bituminous surface treatments many engineers specify the use of screened gravel of proper sizes as a covering for the bituminous application.

Gravel has been used as an aggregate in the construction of bitumionus concrete pavements with more or less success, although for this purpose its use has been limited. More or less has been accomplished, too, in Massachusetts, in constructing oil-gravel roads by the layer method, i. e., upon a prepared and rolled subgrade laying successive layers of asphaltic oil and gravel. This might be termed a modified bituminous pavement.

I have endeavored in this brief paper to call your attention to come of the uses of gravel in highway construction. I have not attempted to treat any part of the subject exhaustively, but rather to direct your thought along the lines of possible inquiry. I have also had in mind the very thorough presentation of the subject of gravel roads as found in the text book by Professors Blanchard and Browne and have tried to avoid as far as posible any treatment of the subject as therein presented with which you are all now familiar.

Convict Road Builders Make Fine Records.

"The State Highway Department should hire convicts from the state prison department in exactly the same way as it would hire free laborers, and at the same price per day. During the hours of work the men should not be thought of as convicts, but simply as employees of the highway department. No payment should be made for a single hour not worked and a man discharged should be removed at once and permanently, while the Highway department should have no responsibility for nor authority over the convicts at any time nor in any manner except to conduct their work or to discharge them."

This need for co-operation between the State Highway and State prison departments is strongly urged in a report made to the New York State Highway department by David J. Shorer, who was in charge of the convict road work in Green County, New York, during the summer of 1914.

Mr. Shorer's practical experience has demonstrated the importance of the recommendation for co-operation between the highway and prison departments in conducting convict road work, which the national committee on prisons and prison labor has advocated for a number of years and has been instrumental in embodying into the laws of the state of West Virginia.

The work in Green county, New York, was carried on under most difficult conditions. The men arrived at the camp before the organization and equipment were completed. They were sent there without regard to their suitability for the work and almost one-fourth were totally unfit and had to be returned to the prison. Arrangements for feeding the men were unsatisfactory, while winter made efficient work impossible fully two weeks before they were removed from the camp.

In spite of these difficulties Mr. Shorer reports that, taking the 60 convicts who were retained at the camp, and comparing them with 51 civilians also working at the camp, the convicts averaged better than the civilians and as good as any ordinary contract gang. Under proper conditions he maintains there will be no difficulty in using convicts for this type of work with good results for the money expended.

The National Committee on Prisons and Prison Labor calls special attention to this report and its conclusion that two factors are essential to the success of convict road work. Responsibility for administration must be placed in the hands of those competent to meet it, and the men encouraged through a system of rewards so that they feel they have something to gain through good work.

Permanent Boone Way Association Formed.

The Commercial Clubs of the various cities and towns along the route between Cumberland Gap and Louisville and the Boone Way Boosters, held a largely attended meeting at Mt. Vernon, Ky., and organized a permanent Boone Way Association with members from all points along the line. This meeting adjourned and met at Crab Orchard Springs, that historic watering place, noted before the war throughout the country, on May 14th, where Boone Way was located and routed from Cumberland Gap to Louisville, via Mt. Vernon, Crab Orchard, Stanford, Lancaster, Danville, Harrodsburg, where the Blue Grass Loop was formed, West loop going via Lawrenceburg to Frankfort the capital of the state and where the remains of the old pioneer Daniel Boone (for whom the highway is named) and his wife are buried. The East loop going via Nicholsville, Lexington, Versailles and converging at Frankfort with West loop thence to Shelbyville and Louisville, the metropolis of the state; a distance of 250 miles, 150 of which is already good turnpikes but will be reconstructed and put in first class shape.

Garrard county has already placed splendid Boone Way markers at end of every mile over their road showing name of highway and distances in both directions, etc.

James Maret, the president of the association, was among the happiest, seeing the fruition of his hopes after a three years battle with nearly every kind of opposition known and unknown, including a multitude of doubting Thomases.

The Boone Way association will work in unison with other highway organizations and be ready to help when proper time arrives for demanding national aid to highways.

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NORTH CAROLINA GOOD ROADS CONVENTION.

When the good roads hosts gather at Asheville on the 14th, of this month for the annual convention of the North Carolina Good Roads Association, they will have much to be thankful for. Agitation for a state highway commission for North Carolina, earnest consideration of plans for securing it and constant struggling toward this end has marked every meeting of the association for ten years. This year the delegates may rejoice over a great victory, nobly earned. North Carolina has a state highway commission and has taken her place along with the most progressive commonwealths of the nation.

Of course, the new state highway law is not perfect. For one thing, the law fixes the annual appropriation for the maintenance of the commission at too low a figure. Instead of $10,000 it should be $50,000 and that is coming later. When it does come, the chances are that it will come because the North Carolina Good Roads Association willed that it should come. But for the untiring, faithful work of the association, extending over a period of many years, the state highway commission would have been a dream today and nothing more.

The Asheville convention promises to be interesting throughout. Governor Craig, head of the state highway commission, State Highway Engineer W. S. Fallis, and other notables will be present and make speeches. Delegates from practically every city and county in the state have been appointed and all indications point to a large attendance. Asheville is a delightful convention city, one of the finest in the state, and preparations are being made to give the good roads people a good time.

KEEPING GOOD ROADS AFTER GETTING THEM.

The governors of many states are issuing proclamations designating certain days as "good road days," and calling upon citizens generally to work on these days upon the highways and to study the best methods of bringing about better roads. As most of our common roads have been made without any study whatever, or left to make themselves, it is very evident that objective study is very important.

Southern Good Roads has given many photographs of governors and other high officials out in overalls with pick or shovel aiding in the construction of good roads, and the people have admired them for their courage in tackling the physical problem; but little has been said about the hours these men have put in in the study of the problem—the study which led these men to lead in constructive work. The study is, in a way, more important than the work, especially by the average roadmaker.

Getting good roads is easy enough. It means simply a willingness to spend the money required. But keeping good roads is another matter and requires a change in certain habits of the public mind which have been so prevalent that some social philosophers have referred to them as a peculiar weakness of the American character.

It is said that when we Americans want to reform or change something we are all too prone to pass a law about it and then forget it, also forgetting that the best laws are useless unless they are consistently enforced. So in our efforts for better roads we have been prone to put a lot of money into the construction and then forget about keeping these roads in repair.

Hundreds of travelers have told us about the good roads of England, France, and other countries. Most of these observers of roads failed to see the men whose daily work justified their admiration of the results—the old fellows with their hammers and piles of stones who go over their little sections every day mending defects as rapidly as they occur.

Yes, we are very zealous just now for getting good roads, going to spend a lot of good money on them. This is well; but it is of even more importance that we adequately provide for their maintenance. It would be well at the beginning to provide both for construction and upkeep.

Chatham county, Ga., will vote some time in August on a bond issue of $375,000 to build a road from Savannah to Tybee and $225,000 for additional permanent roads.

Take Care of the Roads

THE APRIL weather which prevailed in May has left the roads in all states in worse shape for summer motoring or driving than they have been for years. At the end of April this year civic and county authorities investigated the roads that were in their jurisdictions, and reported back the expenditures needed. In many places the repairs or improvements were completed, or were at last under way when the exceptionally wet month of May made the roads as bad, if not worse, than they were before.

In numerous cases this will make double expenditures and naturally the second will have to be much less than the first for appropriations are mostly granted in yearly allotments, and 1915's has been allotted.

Therefore, items of moderate cost will be used more than ever before. Such an item is dynamite. To rend and break quickly and cheaply the rock encountered in grading and to provide the stone for ballast and concrete, explosives are surely necessary.

After such a rainy season as May has produced, side ditches will be necessary, in fact some will have to be dug deeper, and whether they are to be made through rock, or earth, they can always be dug cheaper and better with dynamite than by any other method.

The result and cost will depend largely on the selection of brand and grade, as well as the knowledge of the man undertaking the job. Many kinds are now made, and the best way for officials, road commissioners, etc., is to describe the work to be done to a manufacturer. He, of course, will advise the cheapest and best way of doing it for future orders depend on his advice.

Without getting too deep into technical points, we will endeavor to show how explosives can help build roads economically and quickly.

If the road is to go through a cut in heavy soil, explosives help in loosening up the dirt, thus saving a great amount of picking and shoveling. A cartridge of 20% dynamite or farm powder, fired in tamped holes two or three feet deep, and five or six feet apart, will make this an easy job for the scrapers.

In a hard clay or shaly soil charges of two or three cartridges per hole may be required. In this soil the holes should be four to six feet deep and about six feet apart.

When making a cut through rock, the holes have to be drilled deeper and a stronger dynamite used, such as stumping powder or 40% quarry powder. The holes should be spaced five or six feet apart. Any manufacturer will give complete instructions as to loading and tamping charges.

In building roads stumps often have to be removed, and the cheapest and quickest way to get them out is by firing charges of dynamite under them. Of course, the charge must be put in the earth under the stump, and not down into the center of the stump. If the latter is done, the stump splits, some of it coming out, but leaving the most of the roots below. The road builders may have the good luck to strike no stumps, but may find ditching necessary. On the character of the soil depends what kind and strength cartridges should be used. Experts say that a hand dug ditch usually costs more than a dynamited ditch, and requires much more labor and time.

Dynamite is also used to drain mud holes, miry spots and bogs. In most cases, hardpan has formed a basin and prevents water from seeping down into the earth. Two or three charges of dynamite, fired fifteen or twenty feet apart each way, and 20 to 30 feet deep, according to the location of water bearing gravel or sand, will establish permanent vertical drainage, if the blasted hole is filled with stones.

Prison Labor in West Virginia

By A. D. WILLIAMS
Chief Engineer, West Virginia Highway Commission

THE LEGISLATURE of West Virginia in 1913 passed a bill providing for the working of state prisoners on the public highways of this state. The legislature made no appropriation to maintain them as a state charge, but authorized a State Board of Control to contract with the counties for the expense of operating the camps. A camp was placed in Pleasants county on June 8th, 1914, and another in Berkley county in the same month. Camp No. 3 was placed in Kanawha county August 6th, 1914 with Mr. P. J. Walsh in charge. Thirty men were placed in this camp. The camp was located on the banks of the Kanawha river, consisted of two sleeping tents, one commissary and guard's tent, a tent for the engineer and his supplies, a kitchen, two dining tents. Two men were placed in charge of the prisoners in the capacity of guards only to see that decorum and discipline was maintained. The guards are not permitted to carry arms and the prisoners are given the liberty of the camp. The entire camp is operated on the honor system. Since the camp was established these prisoners have placed 178 cubic yarads of reinforced concrete at cost of $6.70 per cubic yard. This concrete was in small quanities in the form of head walls and small culverts, which tended to increase the unit price more than would have been had the quantities been greater in any one place. Four hundred and forty-one cubic yards of foundation excavation by these men cost an average of 40 cents per cubic yard. Eight thousand yards of unclassified material averaging about 30% rock and 70% earth at a cost of 23 cents per cubic yard and 7000 yards of unclassified material on which a steam shovel was used averaging about 40% stone and 60% earth cost an average of 15 cents per cubic yard.

These figures show that prison labor has proven a success financially, but the greatest profit that can come from prison labor is the benefit conferred upon the prisoners by open air employment. Men that came into camp in a pale, swarthy, dispeptic condition are now stout, hearty and robust and have a different feeling towards society. When they are turned out they will feel that society is not their enemy, but their friend. The view shown herewith gives an idea of the ruggedness of county and the ruggedness of the men, and also shows that prison labor, though in its infancy, in West Virginia has proven a success. The move means better roads and the betterment of men.

Virginia.

The Kenbridge Business Men's Association in Lunenburg county, Va., is seeing to it that permanency shall mark the construction of good roads in that section.

Many counties and many districts have built good roads, very good roads, but too many of them have stopped right there, and made no provision for keeping those good roads good. If the reader desires further information as to methods adopted, the president and the secretary of the Kenbridge Business Men's Association will be glad to give any inquirer further information. The suggestion is that the Kenbridge district is a good one to adopt all over the state.

Texas Good Roads and Drainage Congress

By GEORGE C. SCHNITZER
Houston Daily Post, Houston, Tex.

A movement for good roads embraeing 73 eounties and covering a territory of 10,000 square miles was inaugurated when the Good Roads and Drainage Congress convened in Houston on June 3. The following day the South and East Texas Development League was organized for the purpose of earrying out the propaganda of good roads and drainage.

The two days convention was attended by county judges, engineers and authorities on road matters from 73 counties in the state of Texas. The first day's session was held in the City Auditorium and the closing day on the roof of the Rice Hotel.

The convention was called to order by County Judge W. H. Ward of Harris county who stated its purposes. Mayor Ben Campbell delivered the address of welcome. C. S. C. Holland of Victoria presided.

Clarenee Ousley, director of extension, Agricultural and Mechanical College delivered the opening address his talk being on "Drainage and Good Roads, the Advantages of Enlarged Districts or Community Co-ordination and Co-operation." R. L. Morrison, professor of Highway engineering, Agricultural and Meehanical College spoke on "Some Engineering Phases of Good Roads Undertakings—Class of Construction, First Cost and Indispensable Upkeep."

Brief talks were made on good roads by various county and district engineers concerning their local problems. Resolutions were adopted recommending to the permanent organization to be formed the following day as one of its chief principals the advoeaey of inter-county building and systematie maintenanee of roads.

The session Friday June 4 was presided over by Lieutenant Governor W. P. Hobby. Colonel J. H. Hawley of Galveston, spoke on "How to Finance Good Roads." William Bradburn spoke on "Good Roads Essentials." The convention also took up the problem of drainage as a necessary essential to good roads construetion.

John T. Scott, president of the First National Bank of Houston was elected president of the permanent organization which was formed at this session. The vice presidents will be composed of one representative from each of the counties partieipating and an executive committee of 10, one from each of 10 cities was named.

Richmond to Lynchburg.

The Rural Road Improvement League of Virginia has interested itself considerably over the Riehmond Lynehburg highway. W. Ashby Jones has paeed an automobile party over the route, the party consisting of Louis Phelps, J. H. Nolde, J. Marsden, A. Zaehary, Preston Belvin, C. F. Saver, G. F. Adams and many others. The route follows the James River Road from the Country Club via Sabot through Goochland to Pemberton, crossing James River to Cartersville, thence by Farmville and Appomattox to Lynehburg.

The James River highway is practically eompleted. In this are included the Riehmond to Lynchburg highway, Peninsula route and the Lynchburg-Bristol-Roanoke system. This road is routed through the most beautiful country, its course in many places being for miles at a time on the tops of ridges from which a view can be had for a hundred miles over some of the most picturesque country in Virginia. It is the only road having attraetive approaehes to Richmond, entering as it does by the River Road and passing through attraetive residential distriets.

This route, when eompleted entirely, will extend from Bristol to Fortress Monroe, with ferry eonneetion into Norfolk, and will inelude many large cities and towns. By far the most attraetive portion of it is between Riehmond and Lynchburg. This road starting from Lynehburg on the south side of the James river touches Appomattox, Prospect, Farmville, Cumberland, Cartersville, here crossing the James river to Pemberton, where it follows the river for nearly fifty miles, via Goochland, into Richmond. A road through Buckingham eounty was suggested, but seemed difficult to secure at this time, and the road through Cumberland between Farmville and Cartersville, thirty-five miles, having no grades and no brdges, running the entire distance on the top of a ridge through a very attractive eountry, has been approved for the present, and with eertain improvements now being made it is likely to continue as the principal thoroughfare.

The Growth of the Automobile Industry.

From all present indications there is to be no limit to the motor car industry's growth. The development of the automobile in the past few years has been so marvelous that leading authorities on the subject predict that within a few deeades 25,000,000 ears will be in use in the United States alone.

During the past year more than 1,800,000 motor cars were licensed, and statisticians maintain that 400,000 new ears will be built this season. At this rate the 25,000,000 cars do not appear so very improbable. There is enough money invested in automobiles to build four Panama canals, and if the dreams of the manufaeturers are realized the coming year, two more canals eould be built.

The great Keokuk dam, which was reeently eompleted at a eost of $27,000,000, and which generates 300,000 horse power of electricity, was considered a marvel of the present age. But the eombined horse power of the automobiles in the United States is greater than that which could be furnished by 80 such plants as the Keokuk dam.

By the end of next season the eombined horse power capacity of the automobiles will be equivalent, in the opinion of engineers, to one-half of the combined horse power of all the steam railway locomotives in the entire eountry, and the railroad industry is nearly a century old, while the automobile industry is but a little more than a deeade.

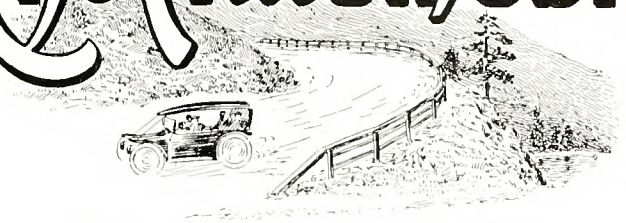
The distance traveled in a single day by the automobiles of the United States is equivalent to one thousand trips around the world, 25,000,000 miles a day, or about 9,125,000,000 miles a year.

In the development of the industry and in the utilization of the automobile the United States has far outstripped every other nation of the world. For every one thousand population in the United States there are eleven automobiles in use, in Germany two, in Franee three and in Great Britain four.

The city of Miami, Fla., will vote August 19 on a bond issue of $150,000 for the construetion of two bridges over Miami river.

On July 23, the city of Meridian, Miss., will vote on a bond issue of $25,000 for the construction of concrete bridges and culverts.

The Automobile in the South



Rules of the Road

By MITCHELL MAY, New York City

The subject of accidents upon the public highways, always an interesting one, is just now receiving much attention upon the part of the press and public.

Of course, any kind of locomotion whether by land or sea or in the air has its peculiar dangers, but as the public highway is so intimately and continuously connected with every one's life accidents upon it receive a larger share of attention than mishaps at sea or collisions on the railways, or any other form or accident not connected with the highway.

The public mind in this matter is largely guided by the amount of prominence given to accidents, and just now motor car accidents excite it more than any other kind, and, therefore, receive greater prominence.

To begin with every good driver upon the road, whether of horses or motor cars, should thoroughly grasp the fundamental fact that the pedestrian has in some places greater rights, in others an equal, and in still others an inferior right on the road in relation to wheeled traffic, and he is supposed to take reasonable care of himself and to see that he does not recklessly incur dangers to himself and others.

In this country we often laugh at the fact that in France a man may be prosecuted for being in the road and being knocked down by a passing vehicle. This, of course, is an extreme case upon the other side of the question.

There are dangers which the motor car driver incurs every time he drives along a highway which are not in the nature of common ones. As generally understood, common dangers, for instance, include the chance of collision with other vehicles at cross roads, of skidding on a slippery pavement, and many other well-known risks which vary according to the traffic, the condition of the road and weather and many other circumstances which need not be considered here.

The driver of a motor car, however, who aspires to a clean record in the matter of accidents has to be more than ordinarily alert. He has to exercise in a special degree the quality of forethought and train himself to calculate beforehand what is likely to happen under certain circumstances which may, at first sight, appears unlikely.

It is foolish to imagine that the dangers of the road can be entirely eliminated or that any form of locomotion can become absolutely safe as regards other users of the highways. But mental alertness while driving a motor car upon the highways has become more than ever essential, if the driver would be a true master of his craft, and the maxim that it is the unexpected that often happens, should always be present in the minds of the drivers.

Foresight and caution are in the case of many well-known and good drivers, natural gifts, but the stupidest motorist can acquire these two features by setting his mind to do so.

As regards the general public, the widespread ignorance and apathy as to the rules of the road is one of the most unsatisfactory features manifested on our highways today. When one motorist encounters, as he will invariably do, nearly one-third of the vehicular traffic upon the wrong side of the road he must not allow himself to become irritated at the apparently deliberate perversity of the average driver of slow vehicles. These drivers do not know or care.

As a remedy for this almost universal breaking of the rules of the road there is a reform which is not only desirable, but practical. The rules of the road and the dangers of the traffic should be taught in every elementary school in the country.

There are probably no children under the age of 10 or 12 years and comparatively few grownups who could give an intelligent answer to the questions as to how to cross a road, on which side to drive and walk, or where to look for special dangers.

A dozen or so simple rules illustrated by plain diagrams would in a very few lessons convey to the mind of the average school and imprint upon his memory for life the best way of avoiding the undoubtedly increasing dangers of the street and of main and cross roads alike.

While the pedestrian, as stated at the outset, has certain special rights, there is no reason to believe that the majority of those who walk upon the highways are so intolerant and selfish as to wish to cause an unnecessary danger and difficulty to vehicular and wheel traffic.

It is true, therefore, that if schools of every description taught their pupils the ordinary rules of the road many accidents and injuries and much loss of life would be thereby averted and much of the chaos, risk and disorder in our traffic would be cured."

* * *

Activities of the Chattanooga Automobile Club.

The Chattanooga Automobile Club played an important role in connection with the Dixie Highway meeting in Chattanooga May 20 and 21. Their part was not so essential or so broad as in the April 3 meeting, for in that instance the club made all arrangements. In fact, entire success of that eminently successful gathering when the Dixie Highway was launched was due to the untiring work of the club, backed heartily by the Chamber of Commerce and Tourist and Convention Bureau. While there was not so much occasion for a big stir on the Club's part in preparation for or on May 20-21, the members felt they should do something to demonstrate hospitality and heighten interest for the visitors. Consequently, the club put on a night automobile parade May 20. Interest in this was given a peculiar zest by two prizes. One loving cup was offered for the visiting delegation entering the largest number of automobiles in the parade. Another cup was offered for the best decorated car, and in this competition Chattanoogans were not excluded.

Probably a thousand automobiles participated in the parade, and a goodly portion of them were decorated. Dalton a thriving North Georgia neighbor of Chattanooga, carried off the cup for greatest number of cars, entering about 50. W. B. Bender, one of the most active club workers in behalf of both meetings, won the cup for best decorated car, his coupe, apparelled in white, being an instant favorite with judges and spectators alike. It was designed as a peace car.

When the parade was formed and ready to start, the "Great White Way" on Market Street went dark in order that the special parade illuminations might be more pronounced. Red fire torches were lighted at intervals of a few feet for several blocks, and this illumination was kept going by attendants as long as the parade lasted. Occupants of the automobiles carried fireworks torches, there were some transparencies, and bombs exploded frequently enough to give a decidedly warlike tone to this feature of the second "Battle of Chattanooga in the Dixie Highway Campaign."

Especially conspicuous during the parade was the big electric sign installed by F. H. Cantrell across Market street in front of his place of business as an electrical contractor. "Boost the Dixie Highway" appeared in brilliant letters 3½ feet high. Five hundred and seventy-six 40-watt lamps were mounted on the letters. The Chattanooga Railway & Light Company donated power and use of lamps for this sign, which conveyed its message day and night during the entire meeting.

The parade was arranged and put on by the following automobile club committee: Ernest W. Holmes, chairman; W. B. Bender, A. H. Rogers, C. A. Brelsford, J. H. Alday, and F. H. Cantrell. The judges in the trophy contests were Mrs. Jesse M. Littleton, wife of Chattanooga's mayor; Rev. T. C. McCallie and D. H. Raines.

While the parade was the principal and most spectacular incidental feature of the meeting, there were others. The Chattanooga Rotary Club entertained the fourteen commissioners and many other visitors at lunch at Hotel Patten May 20. Motion pictures of the April 3 parade were shown. The incorporators of the Dixie Highway entertained the route commissioners at the Mountain City Club. The Chattanooga Chamber of Commerce entertained the commissioners and other prominent visitors at dinner at the Golf and Country Club. Judge M. M. Allison, president of the Chamber of Commerce and one of Tennessee's Dixie Highway Commissioners, presided as toastmaster. May 20, from 5 to 7 o'clock, an informal reception in honor of all visitors was tendered by citizens of Chattanooga at the Hotel Patten, Weber's band, accompanying the Cincinnati delegation, furnishing the music.

Avoyelles Parish, Louisiana, will hold an election July 22 to decided on a bond issue for roads amounting to $350,000. They plan to spend this amount on 80 miles of roads.

Macon, Ga., has available for street improvement $400,000. This will be expended in the construction of about 300,000 yards of concrete pavement, 40,000 yards of brick and 20,000 yards of sheet asphalt.

Fayette county, Ky., has contracted for the construction of three miles of the Dixie Highway. It is to be of asphalt.

Summers county, W. Va., will vote the last day in this month on a $150,000 bond issue for roads.

GOOD ROADS NOTES IN BRIEF

Florida.

President F. O. Miller of the Florida State Good Roads Association, referring in a letter to the Manufacturers Record to the act which takes October 1 creating a State Road Department for Florida, says:

"The State Good Roads Association has worked for the passage of a bill to create a State Highway Commission for the past eight years. On three occasions the bill was lost, after having passed the senate; once on a tie vote in the House and once by a minority of only one vote.

"Under the old system each county board of commissioners was supreme in road building, and there was practically no check on their work.

"The present law, not as strong as our association desired, is yet strong enough to establish an office, exact reports from the various counties and ascertain the true condition of the road situation in the entire state; in other words, we will have a complete survey of the state as soon as it can be made after Oct. 1, and will have such information before the next meeting of the legislature that an adequate bill can be passed for Florida road betterment in future. A large state bond issue is contemplated.

"In the meantime Florida counties are all active and there is more road building being done in Florida now than at any other time in the history of the state.

"The purpose of a road department will be to as far as possible lay out a definite system of highways and induce commissioners to connect up through roads, to fill in the bad places and to make travel in Florida easy and comfortable; also to save the various counties from repeating each others' mistakes, and to have available a first-class road engineer and competent assistant available for advisory service at all times.

"We feel that this bill is the foundation upon which a great agricultural as well as tourist state will be developed."

* * *

Mississippi

Leading citizens of Mississippi have become interested in the importance of a state highway department, and they are now conducting a campaign to secure one for their state, notes the Manufacturers Record. Their organization, the Mississippi Highway Association, is now distributing an interesting illustrated booklet relative to the association's purposes and to improved highway construction in general. All the commercial clubs of Mississippi are combining their efforts with those of the association. The booklet mentioned aims to show the wide scope and attention that good roads are being given and to emphasize the fact that permanent smooth highways are of great importance in promoting the best interests of the state. The various subjects considered in the booklet include the destiny of roads, assets of good roads, state and national aid, opinion of influential men, road materials in Mississippi, inadequate state laws, Mississippi report to National Road Congress, etc. D. J. Morrison, Jackson, Miss., is president of the Mississippi Highway Association, and Dr. J. W. Provine, Clinton, is secretary.

* * *

North Carolina.

Dr. Joseph Hyde Pratt, secretary of the North Carolina Good Roads Association, is sending out the fol-

lowing letter, announcing the annual convention of the North Carolina Good Roads Association:

The annual conventon of the North Carolina Good Roads Association will be held at the Hotel Langren, Asheville, N. C., July 14th, 15th and 16th.

Since the last convention one of the chief objects of the association has been accomplished, i. e., the creation of a State Highway Commission by the General Assembly of 1915. At this annual convention the work of the state commission will be discussed and plans developed for furthering the work and influence of the commission.

The subject of "Maintenance of Roads" will be thoroughly discussed; also, "Organizing of Road Forces."

You are cordially invited to attend this convention, and, also, to appoint five special delegates. Please send names to me as early as possible.

All are invited to attend, whether appointed special delegates or not.

American Motor Car Trade Abroad.

The great development of American motor car trade abroad is epitomized by the automobile expert of "London Life," an English publication.

He points out that the wonderful utility of the moderate-priced American cars, combined with the fact that practically no cars are being built abroad for other than military purposes, leaves the entire civilized world an open field for American manufacturers.

"As though we had not already plenty to make our flesh creep, there is another agitation in the technical weeklies," states the writer. "A number of otherwise excellent folk assert that for a Briton to buy an American car is for him wrongly to subvert his patriotism to his consideration for his pocket. They argue that Britons' money should be spent on British cars, built by British labor, on British capital, in Britain.

"Charity proverbially begins at home, as it should. On sentimental grounds this is a time when one should buy either a British car or one built by one of Britannia's allies, but there are limits beyond which emotional considerations should not be allowed to rule, and they are very soon reached, to my mind, in this matter of car buying.

"One cannot get very many French or Belgian cars, and there are no Russians. It is very difficult to get delivery (within from six to twelve weeks) of any but a few makes of British cars, and nobody can for one moment pretend that the average British car offers anything like the value for the money obtainable in any one of a number of Yankees.

"There is no gainsaying the position that the Yankee manufacturer puts a more widely-appealing car before one, at a given price, than his British competitor can offer. The American car is selling purely on its merits. It is not a catch-penny, gim crack, fall-through-itself kind of fake.

"America gives the moderate-price buyer what he wants, and like a sensible fellow he buys it. I don't know that we can blame him, because this matter of patriotism in purchasing is one that cannot be carried out in its entirety.

"In the last few days I have had letters from nearly 100 British car, tire and accessory manufacturing concerns, all saying we simply cannot turn out stuff except for war orders, and don't expect this state of things to change for some weeks.' That is why so many orders are going to America, and what holds good there holds almost equally good in our dominions over seas."

The commissioners of Cumberland county, Tenn., have authorized the issuance of $200,000 of bonds for road building.

Notes and Briefs

Sandhill township, Moore county, N. C., has voted bonds for $5000 for road improvement.

Marion county, Fairmont district, W. Va., has voted $100,000 of bonds to build 23 miles of road.

Fentress county, Tenn., has voted $15,000 of bonds to build its part of the Dixie Highway.

Brevard county, Fla., has voted $150,000 of bonds for roads and bridges.

Carroll county, Ky., has a road bond election scheduled for August 5. The amount of issue is $50,000.

Siloam township, Surry county, N. C., will vote July 20 on a bond issue of $20,000 for roads.

Irwin county, Ga., votes this month on a bond issue of $50,000 for road improvement.

Bartlesville, Okla., will pave 12 streets.

Pinellas county, Fla., invites bids for the construction of 50 miles of roads.

Precinct No. 1, Kaufman county, Tex., has available for road work $150,000.

The town of Laurel, Miss., will spend $150,000 in paving five miles of streets.

On Sept. 18 Lincoln county, Tenn., will vote on a bond issue of $130,000 for roads.

Bell county, Tex., has contracted for seven miles of improved road in the Holland district.

Boyd county, Ky., will construct a mile of high class road, with concrete base, at a cost of $24,000.

Clarksville, Tex., has contracted for 25,000 square yards of brick paving at a cost of $65,000.

Dallas, Tex., has awarded additional paving contracts amounting to $130,000.

Cecil county, Md., has contracted for road improvement amounting to $65,104.

Richmond, Va., continues street improvement with the letting of a contract for $50,000 of paving.

Cartersville, Mo., will pave ten blocks at an estimated cost of $6,000.

Chattanooga, Tenn., has been asking for bids on 20,000 square yards of paving.

Gregg county, Tex., will grade and surface 15 miles of the Dallas-Shreveport highway.

The road commission of Knox county, Tenn., is planning to spend $22,000 on bridges and culverts.

El Paso county, Tex., will vote July 27 on a road bonds issue of $750,000.

Road Building in Prince George County, Va.

State Highway Engineer G. P. Coleman, accompanied by members of the special joint committee of the City Council, of Petersburg, members of the special committee of the Chamber of Commerce and members of the Prince George Board of Supervisors, made a tour of inspection in automobiles recently over the Rosewood church road to City Point, returning to the city over the River Road. A proposition is on foot to build a broad and permanent highway from Petersburg to City Point, and the object of this trip was to get an idea as to the best route. After returning to Petersburg the party held a meeting in the Chamber of Commerce and informally discussed the road question. Mr. Coleman said he would be glad to have state engineers make surveys and estimates of the cost of building the road. The surveys would have to be made first. The road he said, should be forty feet wide. There is a strong sentiment in Petersburg in favor of building the road and the people expected both by reason of the advantages and benefit to result from such improvement, to contribute liberally to the cost of the work.

SOUTHERN GOOD ROADS

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Annual Meeting of the North Carolina Good Roads Association

By DR. JOSEPH HYDE PRATT

THE ANNUAL MEETING of the North Carolina Good Roads Association was held in Asheville, N. C., July 14th and 16th, and no time in the history of the association has there been a more general representation from the various counties, nor has there been a greater spirit of enthusiasm shown than at this 1915 meeting. There were in attendance approximately 250 delegates from 35 counties of the state representing county and road commissioners, road engineers and superintendents, foremen and good road boosters and enthusiasts. In addition there were representatives from eleven states.

The sessions of the convention were held in the auditorium of the Langren Hotel. The convention was called to order by H. B. Varner, president, at 10:30 o'clock on Wednesday morning, July 14th. The invocation was offered by N. Buckner, the secretary of the board of trade, following which Mayor J. E. Rankin welcomed the visitors to the chief city of Western North Carolina on behalf of Asheville. On behalf of the county of Buncombe, Chairman W. E. Johnson, of the board of commissioners, read resolutions adopted by the commissioners and signed by each member of the board. He was followed by J. W. Haynes, county attorney, who spoke a few words of welcome and dealt with road matters in Buncombe county. Speaking for the business interests of Asheville, W. Vance Brown, former president of the local board of trade, extended to the visitors a warm welcome to this city. All of the speakers assured the visitors that Asheville was delighted to entertain them, and hopeful that their sessions here would be most beneficial. Attention was called to the importance of the work in which the members of the good roads association are engaged and the members were told of the accomplishments of Asheville and Buncombe county in this direction. Representatives of the county reviewed the activities of Buncombe along good roads lines, while the municipality's speakers told of the work which has been done here in behalf of better streets.

President Varner, on the program for the response to the address of welcome, said that he wanted to yield the floor to a speaker who was fully able to respond to the appropriate messages of the speakers who had been heard; and presented Joseph G. Brown, of Raleigh. The latter made a splendid talk in which he said that all men everywhere always welcome an opportunity to visit Asheville, a city which has fared well at the hands of nature, and whose residents have not been content to rest with the natural advantages of the municipality. Amid such delightful surroundings as those of the association, the speaker expressed the belief that the 1915 meeting would be one of much pleasure and a great deal of good, and said that when the association members leave Asheville they will depart with a feeling of genuine regret. However, the regret will be diminished, the speaker remarked, in that they will bear in mind the realization that they may be permitted to return to this city at some future date.

The key note of the whole convention was the maintenance and repair of our public roads. D. H. Winslow, Highway Engineer of the U. S. Office of Public Roads explained in detail the system of maintaining highways that is in vogue on the Capital Highway, which consisted of placing links of the highway in the charge of patrolmen. He showed conclusively that the Patrol System can be made successful, and urged the engineers, commissioners and superintendents to seriously consider putting this method of maintenance into effect in their respective counties. As a result of Mr. Winslow's talk, one chairman of a Board of County Commissioners was heard to say that if he did nothing else in connection with road work of his county, he would leave a system of maintenance in effect, similar to that described by Mr. Winslow. Several other commissioners expressed the same thought. Mr. W. S. Fallis, state highway engineer, took up the question of the repair and maintenance of worn-out water-bound macadam roads. He explained methods now being used in certain sections of North Carolina that were successful and which he stated he believed could be used in nearly all sections of North Carolina where the macadam road has been built. The paper brought out an excellent discussion of the subject, and it seemed to be the consensus of opinion that, except under very special conditions, no water-bound macadam should be built, but that the upper course should be made of bituminous macadam; and that where a county could not afford this type of road all over the county, they should build a combination of this type of road supplemented by a gravel or sand-clay road.

Major W. A. Graham, commissioner of agriculture, discussed the question of maintenance as it relates to the upkeep of the roads connecting the farms with market. He showed why the farmer should be particularly interested in keeping up these roads, and also why

the farmer should enthusiastically support the good road movement.

The subject of maintenance was further discussed by Joseph Hyde Pratt, state geologist and secretary of the State Highway Commission, and he stated that it was the most important, and at the same time the most perplexing road problem that confronted the people of North Carolina today; he stated that one of the main purposes of the association during the coming year would be to preach the gospel of maintenance of roads.

Another subject that was taken up and thoroughly discussed at the conference, was that of federal and state aid in road construction. Federal aid was handled most effectively by Congressman J. J. Britt, and he told the association that he would use his best endeavors in congress in bringing about federal aid to states in the construction of roads. The state aid side of the question was ably discussed by Honorable Gallatin Roberts of the general assembly of North Carolina. He stated that the state ought to help the weaker counties in the construction of their roads, and that one way this could be done was by working state convicts in the construction of roads. Lieutenant Governor E. L. Daughtridge also discussed the question of state aid and the use of state convicts in road construction, and he stated that he favored working these men on the public roads.

In making the report of the secretary, Joseph Hyde Pratt, of Chapel Hill, dealt in detail with the accomplishments of the organization during its existence and in a comprehensive manner told of the work which has been done during the past year. He pleaded that the association give its loyal support to the recently created state highway commission with the declaration that that body, a creature of the North Carolina Good Roads association, must be assured that the organization is behind it in the work which it is doing looking to a better system of highways throughout the commonwealth. The hands of the commissioners must be upheld and the association must act as sponsor for the commission. The secretary called attention to the necessity for the beginning of a campaign immediately looking to the maintenance of the roads which have been built in the various counties of North Carolina. He said that it is extravagant to spend vast sums of money in the construction of highways and to allow the roads to deteriorate through a lack of attention on the part of the county officials. This matter is one which the secretary regards as of vital importance and one which he asked the members to take under thoughtful consideration. If North Carolina is to be known as a state of good roads, the governing bodies of the county must be impressed with the importance of keeping the highways in good condition after they have been built.

In 1909, the state good roads association held a joint meeting in Asheville with the Southern Appalachian Good Roads association, and at that session the state organization pledged itself to carry on the work of building connecting highways throughout the Southern Appalachian mountains. That this pledge has been kept is evidenced by the fact that four roads now traverse the Blue Ridge mountains. Before the general assembly of the state, the organization has worked for various bills providing for better roads, and it is a fact, that practically all of the beneficial road legislation which has been enacted during the past few years has been passed as a result of the activities of the N. C. Good Roads Association. An appropriation has been secured for the highway division of the geological survey, the central highway act has been passed, the Charlotte-Wilmington highway has been incorporated, a law has been passed authorizing the working of convicts on the Hickory Nut Gap road, on the Madison county link of the central highway and in McDowell county, a general act authorizes the use of convicts by the various counties of the of the state upon certain conditions, the Asheville-Murphy scenic highway act has been passed, and the greatest of all of the association's accomplishments has resulted in the creation of a state highway commission.

The Asheville-Murphy highway will be finished, when the people along the route become sufficiently interested and a year hence, or eighteen months as a maximum allowanee of time, will see the completion of this important road. It will connect with the Georgia highway leading from Atlanta to the North Carolina line and in the construction of the road, the North Carolina counties through which it passes will receive hearty encouragement from the Georgia counties through which that state's link passes.

In attendance upon the convention were a large number of the residents of Murphy, Franklin, Bryson City, Sylva and Waynesville, who came to Asheville to hear the discussion pertaining to the completion of the road to that place, and they warmly applauded the prediction of the secretary that the road will be finished at a comparatively early date. In adidtion to the residents of Murphy were a number of the people living at points between here and that place, as well as several Georgians who were hopeful that the day is not far distant when there will be a good highway from here to Atlanta.

D. Tucker Brown, of Chapel Hill, the director of the association, spoke at length of the work which he has done since the last annual meeting in making his annual report and took advantage of an opportunity to pay a warm tribute to the Good Roads Association of Asheville and Buncombe county. Declaring that the state organization can undertake no more important work than that of organizing strong good roads associations in the various counties, he remarked that the local association should serve as an example. It is by far the best in the state, considerably better than any other in the south and probably the best in the entire United States. Mr. Brown said that the state association has assisted many counties and townships in good roads work and has not confined its efforts to the organization of associations. It has given engineering assistance in many cases and more than thirty counties have been benefitted.

Dealing with the work of the state highway commission as a member of that body, Benehan Cameron, of Durham, delivered an interesting address at the afternoon session. He is the author of the bill providing for the appointment of the commission and he told the members of some of the hardships which were overcome in the passage of the enactment providing for the creation of this body. It can do a great deal of good in North Carolina, the speaker remarked, but the people must realize that it cannot do everything at once, and they must be patient. W. S. Fallis, state highway engineer, said that the commission has done a wonderful amount of work since its organization and road operations calling for a total expenditure of more than $1,000,000 are being carried on under its supervision at the present time. John C. Drewry, of Raleigh, pleaded for the support of the commission by the Good Roads Association with the declaration that each member must do all within his power to see that the work of the commission in North Carolina is successful.

The following resolutions, which were passed by the association, give a pretty good idea of the discussions

that were taken up and the action of the association regarding them:

The North Carolina Good Roads Association congratulates the state of North Carolina upon the growth of sentiment favorable to the construction and maintenance of improved roads in every section of the state, and points with pride to the work of the association in the establishment of a system of state highways which is bringing together in closer intercourse the citizens of the state and creating a community spirit among the citizens of the several sections of the state. This association with particular pride, calls attention to its achievements in procuring from the general assembly of 1915 a highway commission for the state, thereby enrolling North Carolina among the great majority of the states of the union in the advancement of improved road buiding. In addition to reiterating the objects for which this association was formed and to impress upon the members of the association and and public at large the importance of matters which are of moment at the present time the association herewith adopts the following resolutions:

First: The maintenance of improved roads already constructed is of momentous importance to every community, and members of this association are urgently requested to go before their boards of commissioners of their counties and their local highway commissions, as members of this association, for the purpose of impressing upon the members of said boards the importance of providing sufficient funds for the maintenance of the improved highways already constructed.

Second: That the association desires to record its opposition to the issuing of bonds for the construction of roads without making proper provision for the maintenance of the roads constructed with a bond issue, and that the general assembly be urged to refuse to pass any bond issue for any county or township for road construction without a provision in the act which will make it obligatory upon the road officials to maintain the roads and that the state shall have authority to see that such maintenance is carried out.

Third: That this association heartily endorses the action of the General Assembly of N. C. in creating the North Carolina Highway Commission and it is hoped that the general assembly of 1917, realizing the importance and efficiency of this commission, will materially increase the appropriation of this commission.

Fourth: That this association heartily approves of and endorses the action of the General Assembly in establishing and creating the Asheville-Murphy Scenic-Highway, and this association pledges its earnest cooperation and assistance in securing an early completion of the same.

Fifth: That it is the sense of this association that upon the completion of existing contracts all able-bodied state convicts should be used in the construction of public roads.

Sixth: That our senators and members of congress be requested to support by their influence and vote the bill appropriating federal funds to aid in the construction of state roads.

Seventh: That the members of this association im-

Fine Sand Clay Road in North Buncombe County, North Carolina, between Asheville and Barnardsville, Showing Morgan Hill School House

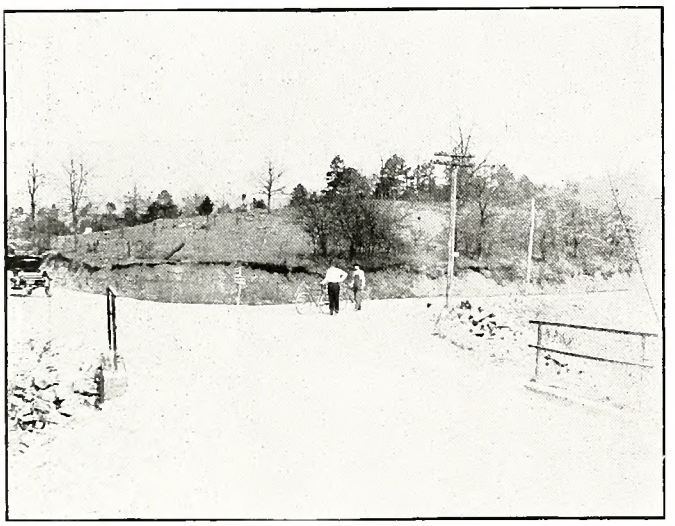
press upon their boards, county or road commissioners the importance of erecting guide posts at all intersections of roads within their counties.

Eighth: That we hear with pleasure that certain counties in the state have established the honor system in connection with working the convicts on a public road, and we herewith recommend the adoption of this system in all our counties of conducting a convict force as it tends to improve the character of the convict and the efficiency of his work.

Ninth: That this association endorses and approves the policy of President Wilson in his efforts to preserve neutrality and protect the rights of American citizens during the existing European war, and hereby pledges its support to the President in any measure he may see fit to adopt to effectively carry out said policy.

Resolution on the death of Dr. Joseph Austin Holmes.

A special resolution was adopted by the North Carolina Good Roads Association, in the annual convention assembled at Asheville, N. C., July 15, paying a warm tribute to the late Dr. Joseph Austin Holmes, director of the United States Bureau of Mines, and previously to that state geologist of North Carolina, whose death occurred in Denver, Colorado, a few days before. Mr. Pratt referred to him as the founder of the North Carolina Good Roads Association. He said that in



Burnside Hill Road, Near Asheville, N. C.

working with the deceased, during the time that the latter was serving as state geologist of North Carolina, that he derived great inspiration from Dr. Holmes for carrying on his own work. He introduced the following resolution which was adopted by a rising vote, the speaker stating that he regarded it as a fitting tribute that the association take such action in memory of the man who had devoted his life to his state and country:

"Whereas, the North Carolina Good Roads Association has heard with profound sorrow of the death of Dr. Joseph Austin Holmes, who was the original organizer of this association, and who as state geologist was the real father of the present good roads sentiment of the state; and

"Whereas, this association desires to give public expression of the esteem in which it held Dr. Holmes, and the sorrow it feels at the news of his death;

"Therefore be it Resolved, First, that in the death of Dr. Holmes, who practically gave his life for the cause of humanity in the operation of the mines of the country, the state and nation have lost one of their most faithful officials and patriotic citizens whose best efforts were always expended for the public good, and his progressive and humanitarian efforts will be missed through the nation;

"Second, That a page of the Minutes of this meeting be set apart to his memory;

"Third, That a copy of these Resolutions be sent to his bereaved family, and copies also be furnished to the press of the state."

The following are the officers of the association for the coming year:

President, Henry B. Varner, of Lexington.
Secretary, Joseph Hyde Pratt, of Chapel Hill.
Treasurer, Joseph G. Brown, of Raleigh.
Director, D. Tucker Brown, of Chapel Hill.

Program for Pan-American Road Congress.

The literary program which is being prepared for the Pan-American Road Congress covers the entire range of subjects connected with the construction and maintenance of country roads and city streets.

The men who will present papers or deliver addresses are the best known authorities in the United States and Canada. Among those who have already accepted assignments on the program are the following:

G. P. Coleman, State Highway Commissioner of Virginia—"Convict Labor for Highway Work."

Wm. H. Connell, Chief, Bureau of Highways and Street Cleaning of Philadelphia, Pa., "Dust Suppression and Street Cleaning."

Geo. W. Cooley, State Engineer of Minnesota, "Road Drainage and Foundations."

A. W. Dean, Chief Engineer, Massachusetts Highway Commission, "Maintenance, Materials and Methods."

A. B. Fletcher, State Highway Engineer of California, "Organization and System in Highway Work."

W. S. Gearhart, State Engineer of Kansas, "Highway Bridges and Structures."

Nelson P. Lewis, Chief Engineer, Board of Estimate and Apportionment of New York City, "Highway Indebtedness: Its Limitation and Regulation."

L. W. Page, Director, U. S. Office of Public Roads, "The History and Future of Highway Improvement."

Frank F. Rogers, State Highway Commissioner of Michigan, "Roadway Surfacings."

Prof. L. S. Smith, University of Wisconsin, "The Educational Field for Highway Departments."

Col. E. A. Stevens, State Commissioner of Public Roads of New Jersey, "The Essentials of Proper Laws for Highway Work."

W. D. Uhler, Chief Engineer, Pennsylvania State Highway Commission, "Resurfacing Old Roads."

Among those who will preside at the sessions of the Congress are the the following: Fairfax Harrison, President, Southern Railway Co.; W. A. McLean, Chief Engineer of Highways and Commissioner, Ontario Public Roads and Highways Commission; Col. W. D. Sohier, Chairman, Massachusetts Highway Commission; George W. Tillson, Consulting Engineer to the President of the Borough of Brooklyn, New York City.

Laurel, Miss., has awarded $94,827 contract for street and sidewalk paving; 27,753 square yards asphalt, 10,078 square yds. of wood block, 23,098 square yds. gravel pavements and 35,200 square feet of concrete sidewalks.

Pine Bluff, Ark., has awarded $48,768.40 contract for street paving in District No. 35; asphaltic concrete, with brick between car tracks.

Asphalt Macadam Roads

By B. L. FIELD, Greensboro, N. C.

UNTIL the advent of motor traffic the waterbound macadam road was recognized as the most popular type of improved road for the main traveled country highways, by reason of its most nearly attaining the conditions set forth above. The changed character of traffic, however, has demonstrated beyond doubt that an ordinary waterbound macadam road cannot successfully withstand the raveling action of a considerable amount of heavy and fast motor traffic. The per cent of motor traffic on the through highways is about three-fourths of the total amount.

In order that the economic advantages of the waterbound macadam road might still be retained, and that the roads of that type already built might not be a total loss, recourse was had to treating the road surface with bituminous materials to bind the stone together, rather than to adopting some entirely new and more expensive type of construction. Experiments along this line have developed two general methods of applying the bitumen to the surface stone which have been largely followed in this country, one known as the penetration method.

In the penetration method, which is the one treated in this article, the bitumen is incorporated with the mineral aggregate by applying it on the top of the road after the stone has been laid and allowing it to run into, or penetrate, the voids in the stone. By the mixing method the bitumen is incorporated with the stone before it is placed on the road. In both cases it is considered sufficient to incorporate the bitumen with only the upper two or three inches of broken stone, constituting what is known as the wearing surface.

Choice of Type.

There has been a great deal of controversy between engineers as to the relatives merits of the bituminous macadam as built by the two methods of construction, but a comparison of the two will not be entered into extensively here as it is believed each is suitable for a character of traffic which the other is not. The mixing method, which is relatively expensive, is a satisfactory substitute for the asphalt pavement in cities where the traffic is very dense; while the penetration method, which is much less expensive than the former, is the type for the main country highways, where the traffic will average from 100 to 300 vehicles per day of which 75 per cent may be motor traffic.

There are some who would abandon the penetration method entirely because there have been a few failures of roads of this type. If this reason were adopted as a criterion, every type of road in existence would be condemned. On the other hand, there is no lack of evidence of the penetration method having produced some splendid roads where good materials have been used under competent supervision and thorough attention has been paid to details. A typical example of its success is found in the large mileage of fine asphalt-macadam roads in Los Angeles county, California, where the mixing method has not been used at all.

Charles A. French, city engineer of Laconia, New Hampshire, says in the Engineering Record of February 7, 1914: "This city has built since 1908 about 60,000 square yards of bituminous macadam pavement, the greater portion of which has been constructed by the penetration method and the remainder by the mixing method. All the work was done by day labor under the same supervision and by practically the same men and equipment using the same materials. We have found the penetration method to be much more satisfactory in every way and to be about 35% cheaper."

The New York Highway Department has built about 1300 miles of bituminous macadam by the penetration method during 1909-10-11. These roads are reported to be in good condition now with very few failures. They have been giving excellent results with all indications that they will continue to give satisfaction for some time to come. The failures have been less than 1% of the total mileage built.

Causes of Failure.

Where failures have occurred they can generally be traced to some defects in the original construction. The main reasons for such failures as given by Spencer in "Transactions of the American Society of Civil Engineers" for 1914 are:

"1. Improper foundation.
2. Improper sizes of mineral aggregate.
3. Top course becoming sealed before bitumen is applied.
4. Bituminous material of wrong consistency.
5. Uneven application of materials."

The outstanding features of a method of construction that will eliminate by prevention the failures due to these causes, as shown by experiment and experience, are:

First—The preparation of a well-drained and thoroughly compacted subgrade;

Second—The use of uniform large-sized stone, 1½ to 2½ inches, in the top, or wearing course;

Third—The use of a bituminous binder that is tough, fairly hard and which sets up quickly;

Fourth—The application of the bituminous material by an air pressure distributor, instead of by hand pouring.

A method embodying these essential of features has been in use in Massachusetts for the past few years and has given excellent results. Too great stress, however, cannot be laid on careful attention to details.

Good Drainage Essential.

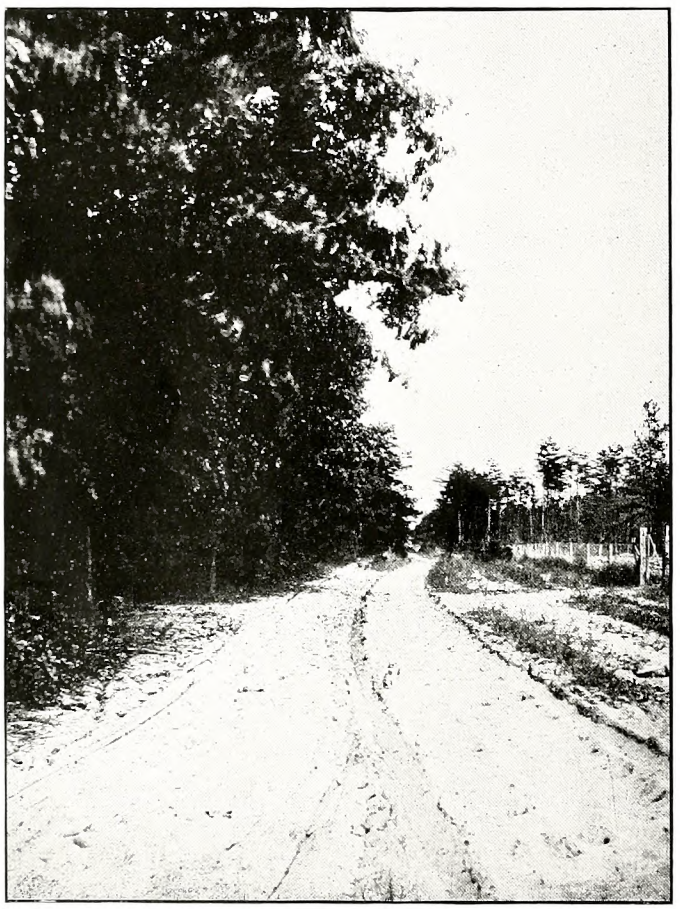
Thorough drainage is even more essential in bituminous construction than in water-bound macadam or earth roads, since in the former the surface is impervious to moisture, and the water which gets underneath cannot dry out through the road, but must be entirely taken care of by drainage. Where the subsoil is naturally well-drained, a broken stone base can be used. The subgrade must be thoroughly rolled with a 12-ton roller until no further settlement is discernible. The base may be laid with broken stone, varying in size from 1½ to 2½ inches, to such a thickness as will compact under the roller to about 4 inches. After thoroughly rolling, the voids are partly filled with stone screenings, and the whole course rolled again. It is very important to roll this bottom course until it is well compacted and shows no movement under the roller, otherwise depressions will appear in the wearing surface. Where depressions appear in the base, level up with stone and roll again.

Where it is desired to use an existing old macadam

Editor's Note—This paper won prize of $50 offered by the Barber Asphalt Paving Company, to students of the University of North Corth Carolina for papers on highway construction.

for the foundation, 2 inches of new stone may be sufficient. The old surface should be well cleaned, and then be leveled up and put in good shape by scarifying and rolling before the new stone is applied.

Upon the base thus prepared the trap rock for the top course is laid to such a depth as will compact to 2 inches under the roller. The stone in this course should be uniform in size, 1½ to 2½ inches in diameter. It is then thoroughly rolled with the 12-ton roller and all depressions filled. No screenings are applied before applying the bitumen as this tends to seal up the surface and prevent the proper penetration of the bitumen. The top course should be dry-rolled so that there may be no moisture in the upper layer of stone when the



A bad sandy stretch on the Federalsburg-Houston, Md. road before improvement

bitumen is applied. Any water on the surface of the stone fragments will prevent a thorough bond taking place between the stone and bitumen. When this course shows no movement under the roller, it is ready for the bituminous binder.

The bitumen should be fairly heavy natural asphalt and applied at a temperature of 350 degrees (Fahr.) under a pressure of 60 lbs. per square inch. About 1¾ gallons per square yard are required for a 2-inch surface. The greatest care should be used to apply the binder uniformly. This should be covered immediately with a light layer of small gravel, or pea-stone, just thick enough to prevent the roller from picking up the surface. The pea-stone is broomed and used to fill the voids and is then thoroughly rolled with a 6-ton roller. After rolling, a seal coat of bitumen is applied by pressure distributor at the rate of about ½ gallon per square yard. This is again rolled with the light roller after a thin coat of the pea-stone has been applied to prevent sticking. After this final rolling, the surface may be opened for traffic within 24 to 48 hours if the bitumen used be one which sets up quickly, such as a natural asphalt.

Large Stone Desirable.

Large stone of uniform size for the wearing course is considered by some of the most experienced engineers to be a very important factor in the success of the penetration work. Each piece of stone then has a bearing on others of the same size, and a layer of such stone can be well keyed together by rolling. Mr. Pillsbury, the engineer who has charge of the penetration work in the state of Massachusetts, gives a large part of the credit for the success of this method there to the use of this kind of stone in the wearing surface. If smaller size particles are introduced into the surface, the result is to wedge the larger pieces apart and prevent complete inter-locking and the stability which is obtained with stone of uniform size. It has been observed that with large stone there is less tendency to ravel even when the life of the binding material is partially destroyed.

Another reason for the use of large stone of uniform size is that it allows better penetration of the binder, even after the top course has been rolled, than is usually secured with a graded stone unrolled. On a surface of this kind a limited excess of bitumen can be used, and this will exist in the road surface as a reservoir of material to enrich the road constantly under traffic, where it would dry out and ravel with a graded stone merely coated with bitumen. This size of stone required about 3-8 gallon of bitumen more per square yard per inch of top course, but considering the fact the binder is the life of the road, the small increase in cost is more than justified by the increased efficiency of the road.

It is most important that the binder be applied uniformly so as to obtain a uniform mixture of the stone and bitumen. This can best be accomplished by machine distribution. A machine which delivers the material in the form of a spray that hits the stone in the road at a high velocity is preferable to one that delivers the material in the form of a sheet under low pressure. A small engine is is usually attached to the sprayer to maintain the desired airpressure.

Importance of the Binder.

Since the life of a road is no longer than that of its binder, the material selected should possess the characteristics of cohesiveness, lack of brittleness, and resilience. Although various types of binders have been used with good results, the natural asphalts have almost invariably been preferred for roads carrying the heaviest traffic, because of their greater cementing value, their stability, and their higher resistance to disintegration by moisture. Another advantage is that by reason of their containing but a small percentage of volatile constituents, they set up quickly and do not bleed during the hot days of the summer. Coal tars and paraffine base petroleums have been used but they are deficient in cohesive quality. No binder containing paraffine should be used, as it tends to make a mushy, disagreeable mud in wet weather, and does not bond well with the stone. To provide against the use of inferior materials, the road officials should buy a binder of known quality and furnish it to the contractor. In case this is not done, the road may be paid for at so much per gallon of bitumen used instead of by the square yard, and thus leave the contractor no incentive to economize on the amount of binder used.

The fixed charges on the roads built by the mixing

method in the way of interest and sinking fund makes it more costly and less economical in the end than the cheaper road built by the penetration method with a moderate cost of maintenance. For instance, a mile of road built by the penetration method, assuming an average cost of $1.10 per square yard and a 16 feet roadway, will cost $10,320, and should be capably maintained for $250 per annum.

On the other hand, a mile of road of the same width built by the mixing method, assuming an average cost of $1.60 per square yard, will cost $15,010. This necessitates an interest charge on the extra $4,690 cost, which at 4½ per cent would be $211 per year. To this must be added a sinking fund of 1 per cent, which would make a total of $258. Assuming that the maintenance cost of the road built by the mixing method is no more than that of the one built by the penetration

The same section of the Federalsburg-Houston road after improvements. Photo by U. S. Office of Public Roads

method, this gives $258 as the annual excess upkeep cost per mile of highway. When it is considered that for moderate traffic roads the life of the two would be about the same, it is at once evident that a great saving is effected by the adoption of the former type.

We are on the eve of an era in road building comparable only to railway building between 1840 and 1880. There is every evidence that we will be able to obtain roads suitable for a moderate amount of traffic at a reasonable cost. We need not be driven always to the most costly types of roads, the building of which would very greatly reduce the mileage of new roads which could be built with reasonable appropriations. To the fullest extent in an economical way, we should seek to extend the greatest good in the way of roads to the greatest number of people. The cheapest road that is suitable for the traffic should be built. The bituminous macadam road built by the penetration method according to the methods laid down in this paper, with careful inspection, and with competent engineering supervision, is destined to play an important part in the building of the main country highways of the future.

The Dixie Highway in Tennessee.

Judge M. M. Allison, president of the Dixie Highway association, returned to Chattanooga, July 22, from Winchester, where, with Col. A. M. Shook, of Nashville, the other director from Tennessee appointed by Gov. Rye, he held a public hearing with reference to the routing of the Dixie highway through Franklin county. Judge Allison held a similar hearing and conference with the officials of Marion county at Jasper conferring later with Col. Shook before announcement was made regarding the routing.

According to the decision of President Allison and Director Shook, the routing will be from Tullahoma to Winchester, via Winchester Springs. From Winchester the Dixie highway will be routed via Cowan and Sewanee to Monteagle, where the highway will strike the Marion county line. The routing in Marion county will be from Monteagle across Battle creek to Jasper, thence to Whitwell. In the event that Hamilton county will build the four and one-half to five miles of additional road, the Dixie highway in Marion county will enter Hamilton county at the forks of Suck creek. In Hamilton county the Dixie highway will come under Signal point, passing by the Elks' country club and connecting with the Signal mountain road, coming into Chattanooga over the new bridge.

When the selection of this route of the Dixie highway was made known to officials in the two counties, announcement was made that preparations for work would commence at once.

Good Roads Man Dead.

A. R. Pardington died at Detroit on July 28th. He was widely known as the first chairman of the A. A. A. contest board, and his work as vice president and active head of the Lincoln Highway association made him a national figure.

In commenting on Mr. Pardington's death, Henry B. Joy, president of the Lincoln Highway association, made this statement:

"In the death of A. R. Pardington, vice president of the Lincoln Highway association, the patriotic work suffers an irreparable loss. His collaborators have lost a commanding officer of peerless efficiency, of unflagging effort, of unflinching judicial fairness, with a patriotic devotion to the cause of the great memorial the Lincoln highway, such as could not be exceeded in any cause.

"It is not too much to say, it is not enough to say, that the Lincoln Highway insignia, stretching from Jersey City on the Hudson river, to Oakland on the Pacific, is more his work than that of any other man. Thousands have given dollars to the cause; Pardington gave himself."

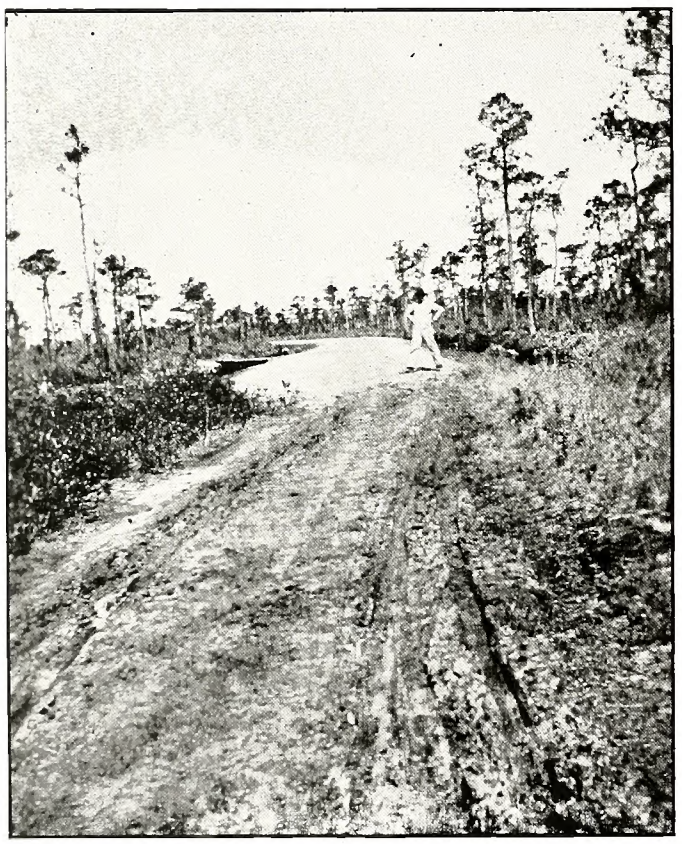
The commissioners of Rowan county, N. C., have let the contract for the steel for nine bridges to the Virginia Bridge and Iron Co., of Roanoke, Va., at $3,369.

Marking the Capital-to-Capital Highway

By J. B. CROFLON, JR.

THE PLAN that has been put on foot by Captain D. H. Winslow, government road engineer, for the division of the National Highway, running from Richmond to Fayetteville, N. C., is being carried out very successfully and with very little expense. The National Highway running from Washington to Atlanta by the way of Richmond, Petersburg, Alberta, South Hill, Boydton, Clarkesville and Raleigh, is being marked in a striking way and this route will be cinched for all times to come as the original and true National Highway.

Captain Winslow has adopted a color scheme for the blazing of the National Highway. Six feet from the ground on each telephone or telegram pole along the route, bands of red, white and blue have been painted,



Improved road in Craven county, N. C., taken from Carteret side of the line. No trouble to tell where the Craven line is located

each band six inches deep. These colors are the same as our national colors and indicate within themselves the National Highway.

Captain Winslow took the matter up with the Chambers of Commerce of the cities and towns along the route and all the towns have co-operated with him heartily and have given the paint for the purpose. The highway will soon be in active use by the tourists, and now is the time for all of the cities and towns along this line to get busy in order to get the tourists coming and going from the North to the South. Captain Winslow said that the color scheme was better than signs, as the latter get knocked down or mischievous boys turn them upside down or play other pranks with them.

Not only that, but new roads are constantly being built into this main highway, and will be more and more so, and tourists will incline to turn into these new roads, especially if they are well constructed, for the inclination is naturally to think the best-looking road is the one that has the government's sanction. By the blazing of the highway with these patriotic colors, the tourist will stay on the track without difficulty.

The national highway is progressing in a very encouraging manner, according to Captain Winslow's statement and he is well pleased with the co-operation he is receiving all along the line from the Chambers of Commerce of the cities, the Business Men's Associations in the small towns, the business-spirited people, and especially the Boards of Supervisors throughout the counties that this road traverses. Captain Winslow is having all of the bushes and trees cut and removed from the inside curves along the road, thus giving a plain view so that danger of drivers running into each other is materially reduced. For each nine miles he has under his charge a patrolman whose duty it is to drag the roads after every rain, remove the bottles, tin cans and whatever barrier there may be, and to keep the road in good repair. An accurate report is kept daily of each patrolman, and also a report of the progress and sanitation of the country. The following will better illustrate the progress he is accomplishing along this road. The followng improvements have been made in the counties named during the past nine months: Dinwiddie, ten new buildings and fourteen painted; Brunswick, twenty-seven new buildings and thirty-one painted; Mecklenburg, twenty new buildings and thirty painted.

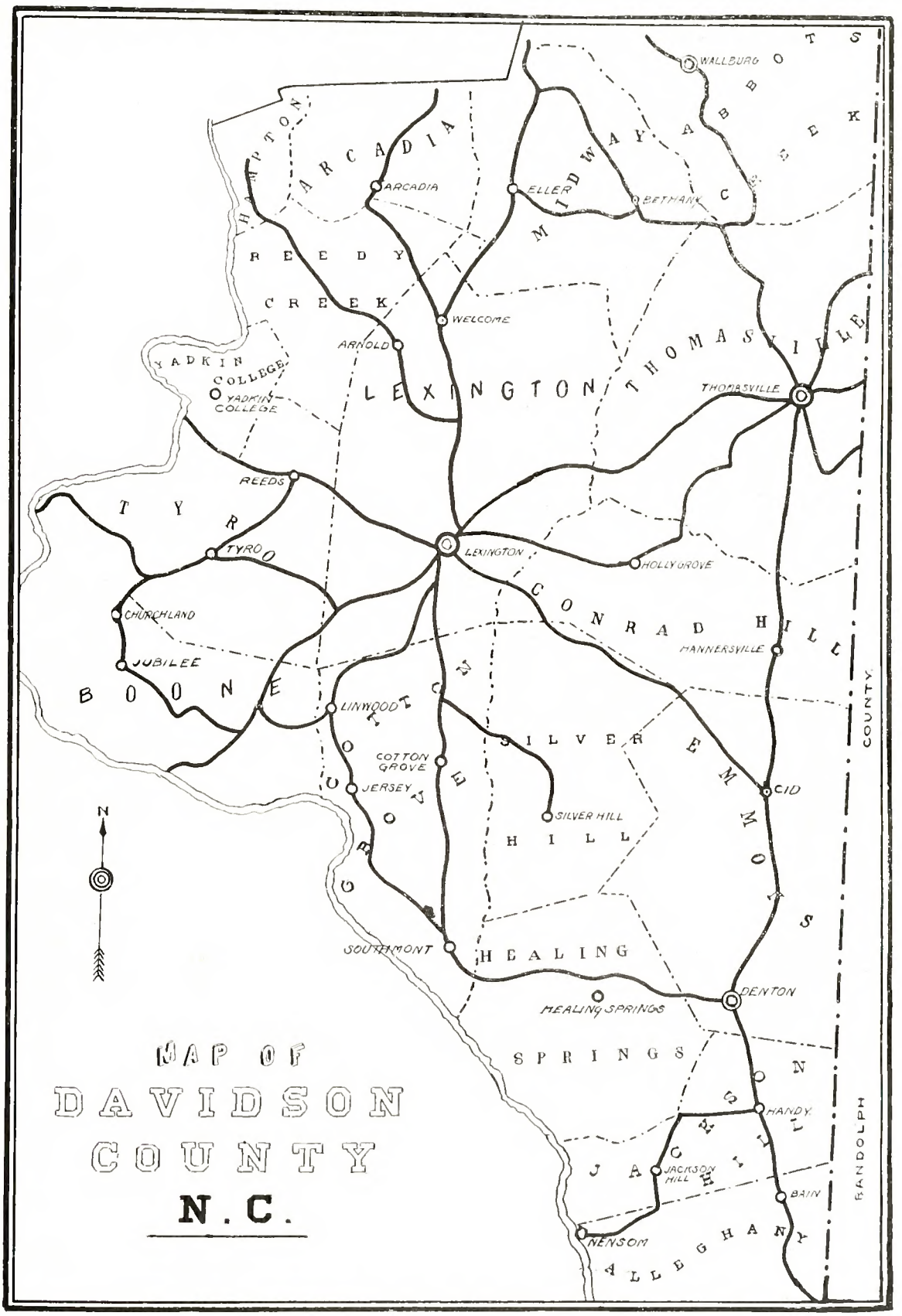
Some of his patrolmen have removed as many as 200 tin cans and bottles in a single day; one patrolman has removed over 800 tin cans and 600 bottles along his division since Captain Winslow has taken charge of the road.

Captain Winslow is giving lectures all along the line and his idea is to create public spirit and impress upon the people the importance of this road. The people are becoming very much enthused over his work and lectures, and are giving considerable aid in the maintenance of the National Highway. His idea is to work up a spirit of public pride in the children as well as the old people in cutting down the old hedges along the roadside, clearing up the front yards and beautifying their homes in general.

He further stated that garages, gasoline and water tanks were now conveniently situated on the National Highway, and this alone was a great inducement for the tourists to travel this route. This division of the National Highway is the only road in the United States that the government has a road engineer in charge, and that it was the grave intention to make this a sample road which would be a guide for the people to build and maintain other thoroughfares.

The work now being done by Captain Winslow is very creditable work, and the people are well pleased with the results of his efforts and within a short while he will have our roads in excellent condition.

McKinney, Tex., received bids on July 29 for 15,000 feet combined curb and gutter, 23,000 square yards asphaltic concrete pavement and 6000 square yards brick pavement; estimated cost $62,000.



PROPOSED ROAD SYSTEM FOR DAVIDSON COUNTY, N. C.

The above map shows the road system mapped out for Davidson County, North Carolina, by the Davidson County Road Commission. It covers approximately 220 miles. The county has a bond issue of $300,000 with which to build the roads. The commission has adopted the policy of building roads only where the people will give right-of-way and top soil surfacing and hopes to be able to construct the whole mileage with $300,000. Only the top-soil and sand clay roads are being built.

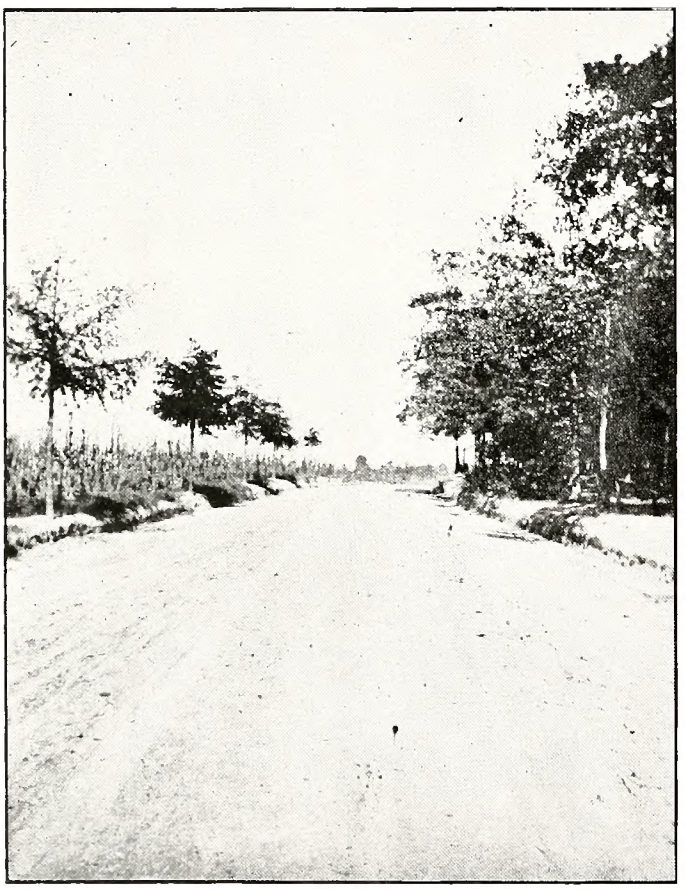
The Road Doctor

By J. D. CLARKSON

President 365-Day Road Club, Carthage, Mo.

AS A RESULT of our article on the subject of good roads, published in Southern Good Roads, we have received numerous letters asking for details on the various branches of road building from five states but none of our correspondents go sufficiently into detail to enable us to handle the subject understandingly.

The physical part of road building; that is the actual moving of the dirt, rock and gravel, the construction of water ways and the supplying of the right kind of machinery to do this expeditiously and efficiently



Sand clay section of Stantonsburg road, Wayne county, N. C.

depend so largely on local conditions that one must be acquainted with these conditions to some extent, before one could give any intelligent advice.

One might send word to a physician that he was sick and ask treatment, but the good doctor would want to know something about symptoms and conditions, both physical and mental before determining whether to administer a purgative, a tonic or just bread pills and a good talk.

Our experience teaches that more bad roads are the direct result of the bad mental conditions of the community than the bad physical or financial conditions.

It is because of this that the 365-Day Road Club puts at the very top of its list of cardinal principles the dogma, "Put the people in your problem," and by this we do not mean men working with picks, shovels, teams and scrapers, but men working with brains and possessed of courage sufficient to not be appalled by a few difficulties.

One such man in a community will build more good roads than fifty men with picks, shovels and scrapers whose activities are paid for by tax money or credited on poll tax accounts, for this one man in a state of eruption will bring forces into action in that community that will replace, the perfunctory pick and shovel men, with power machinery backed by a public opinion that will not only demand better results in road building but help get them by showing intelligent interest and responsible appreciation.

We have had people smile when it was intimated that there was any mental branch to good roads building and our experience is that where the smile was the broadest the bad mental conditions were the worst.

When the Lord promised to save Sodom from destruction it was on the compromise agreement that ten good men could be found in the community. But one good man, equipped with ordinary brain power, in a state of eruption, on the subject of better roads, can save any community from the curse of bad roads for this one man will soon have ten followers, each of these ten will have ten others, and then desirable results will begin to appear.

The basis of this must be men—men joined together to work as a unit in a determined effort for better road conditions—men willing to subordinate personal interests to the public good and get their benefit as a part of the community.

Better roads can not be had by wishing. Work must follow the wish and the place to commence work is in the minds of men.

Some years ago a few workmen wished for homes of their own but none of them had the money to build. They held a few meetings, others joined their gatherings, the first Building & Loan Association was formed and many homes were built. This was acting along community lines.

The Building and Loan idea is well established now but there was a time when it seemed just as hopeless for a wage earner to attempt to build a home as it is now for some communities to build good roads.

Practical Suggestions.

The first thing for a community to do that has a real desire for better roads is to form a road club with as large a membership as possible to discuss the subject in all its bearings.

In this original organization there should be no thought or hint of contributions.

After several meetings for discussion only, the membership having been pushed to the limit and the good roads sentiment having been fanned into a flame, appoint a committee to consider ways and means. Let this committee consider well the financial resources of the community and fix on a sum that the committee thinks can be raised by donation for general road betterment in that community. Do not guess at it but canvass each individual name and put down his probable subscription. Add these various sums together and whatever lump sum it foots up just double the sum and start the subscription paper.

Make the first condition of this subscription paper

read like this, "A total subscription of $———— is to be secured or none of it is to be binding."

It will take some courage to double the estimate. It will take more courage to say "That much or nothing," but success awaits the men who possess this courage and failure looks those in the face who do not possess it.

The first year we started out to raise $5,000 or nothing. We got $7,200. The second year we started to get $6,000 or nothing. We got $8,400.

Make the various sums payable in monthly installments for twelve months.

Never permit the discussion of the improvement of any particular road, nor take a subscription conditional on the improvement of any particular road until after the lump sum determined on for the year's work is subscribed.

Having provided the road club with this lump sum to be devoted to improvement of the roads of the community it will then be time to provide for the manner of its expenditure.

If the amount raised is sufficient or nearly sufficient to buy improved power machinery it will be well to buy it.

If it is not sufficient to encourage the purchase of power machinery then it can be allotted to the improvement of such roads as may provide a similar sum by the property owners, to be further augmented by tax money.

For Example.

If the property owners on a certain road will raise by private subscription $100.00 or $500.00 then the club adds $100 or $500 as the case may be, provided the legal road authorities will add as much as the sum of the subscriptions of the property owners and the road club.

By following this plan in the allotment of the club's money it will disarm any charge of unfairness in the allotment of the club's money.

The road club's officers and directors should be the best men in the community, give their services free, allow no selfish interest to influence them and administer the affairs of the road club in the most fair minded and efficient manner.

If they will do this the road club can be organized the second year bigger than ever and by the third year the good roads sentiment will have become so strong that road taxes can be increased and the club subscriptions discontinued in part or altogether. "God helps those who help themselves."

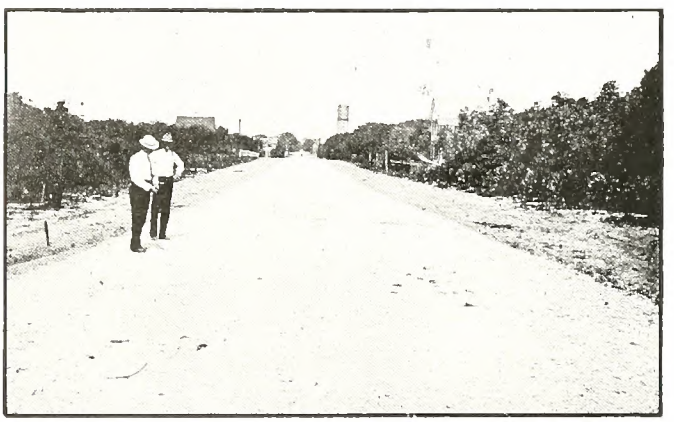
If after forming a road club in any community further advice is wanted as to the physical construction of roads, and we are advised fully of local conditions, we will give what advice we can.

How to Make and Keep the Road Dry.

Water, plus clay or ordinary earth, when mixed, invaribly forms mud. On ordinary earth roads the rains and melting snow furnish the water and the passing traffic the mixing, and the result is muddy roads. Take away the water or prevent it from mixing with the clay or earth on the road surface and little or no mud will result. In other words, keep your road dry if you wish it to remain hard, smooth and free from mud.

Except in very sandy or arid regions, good drainage is the cardinal principle in the maintenance of earth and gravel roads. Get the water away from the road as quickly and completely as possible. Water naturally seeks the lowest level. You can not keep the water from falling on the road, but you can assist its natural inclination to get away to a lower level. Keep the ruts filled and the road crowned with a slope towards the side ditches of from three-fourths to one inch to the foot, and the water will not collect on the road and soak in and be mixed to mud by passing traffic. Keep the side ditches clean and with frequent outlets to get the water away from the road entirely. Do not let the culverts clog up or material accumulate in the ditches and hold back pools of water to soak into and soften the foundation of your road. Water is an enemy that will run away if you will give it a chance. Do not neglect to give it every chance. It will pay and pay well.

Like most other enemies, water is not very destructive or dangerous until it collects in force. Therefore, get the water away from your road at every available opportunity and before it has time to collect in sufficient volume to be dangerous to the road, and do not invite certain disaster by making your culverts too small to care for the largest possible storm. Furthermore, build the culverts so that the water will, of necessity, flow through them and not find a way around or beneath them. Properly designed substantial wing and



Shell Boulevard to the Beach, Fernandina, Fla.

end walls are the fortification which protect the culvert from attack and destruction during severe storms. Do not build dry weather culverts; build them with a view of caring for and protecting the road during the worst possible storms.

Make your road dry, build it hard and compact with a crown sufficient to shed water rapidly to the side ditches, and with ample culverts and drains. To keep your road dry maintain the drainage in good condition. Drag your roads after each rain; dragging fills in the ruts, smooths the surface, and maintains the crown. On a road which has been properly dragged the rain finds no place to collect and soak into and soften the surface. Unless the rain is of long duration the surface is softened but very little. As soon as the rain has ceased and the road surface dried so that the clay is not sticky, but while it is still plastic, drag the road again. Any depression or ruts which have been formed during and after the rain are thus filled, and the surface smoothed up and plastered over with a thin plaster of clay or earth which packs and becomes very hard under passing traffic. Therefore, in order to make and keep your road dry, first provide for good drainage and then maintain the good drainage by systematic dragging after each rain. Dilligent attention to these points will, in general, insure an earth road fairly passable at all times and very good most of the time.

Livingstone county, Mo., will build 15 to 20 small bridges.

SOUTHERN GOOD ROADS
A MONTHLY MAGAZINE
DEVOTED TO HIGHWAY AND STREET IMPROVEMENT

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GOOD ROADS INTEREST EVERYWHERE.

The writer recently took a leisurely jaunt through Davidson, Davie, Yadkin, Surry, Alleghany, Ashe Wilkes and Iredell counties, North Carolina, and Grayson county, Virginia. In this journey he traversed the rolling Piedmont section and crossed the Blue Ridge twice, covering about 250 miles with a horse and buggy.

The trip was interesting throughout. Having been engaged in producing this magazine for five years, naturally he kept an eye open for road improvement all the way. The section of country covered offered as many varieties in climate, soil and people as can be found on a similar journey anywhere in the land and the conditions met with are doubtless very similar to conditions in all other parts of the country.

Starting from Lexington, Davidson county, the first evidence of good roads activity was found within a mile of the courthouse, where the county chain gang was busy building a good road. Davidson county has a force account gang, the convict gang and several contractors' gangs at work building roads. A bond issue of $300,000 has been provided and a complete system of roads is to be built. Elsewhere in this issue appears a map of the Davidson county road system.

Striking Davie county at Oakes Ferry, rough roads were encountered all the way to Mocksville, the county seat. Davie has issued bonds and is building a system of sand clay roads but the system is not complete. It is possible to go from Fork Church, in eastern Davie, to Mocksville by sand clay road but it is some three or four miles nearer by the other road, which is very rough.

North of Mocksville the road is very fine for miles. In Mocksville contractors were busy building the town's part of the government post road that runs from Statesville to Winston-Salem. They were laying the top-soil 18 to 24 inches deep, crowning the street beautifully and providing adequate drainage.

Another contractor's force was encountered building a bridge near Mocksville and still another in northern Davie grading a road. Davie is wideawake and intends to have good roads everywhere.

Yadkin county showed no sign of good roads interest. The county is to have one model sand-clay road, clear through the county, and for this $60,000 has been raised by bond issue, but the remainder of the roads are as bad as can be imagined.

In Surry county there was plenty of interest. Elkin township has issued bonds and contractors were busy building good roads north toward the Blue Ridge. Mt. Airy township has also issued bonds and five other townships are to vote this month on bond issues for roads.

Alleghany county has not waked up yet. The people are more interested in getting a railroad to Sparta than in anything else. When they get the railroad, good roads interest will follow. In Ashe, like conditions prevailed. Only in one township, Jefferson, was there interest in good roads. A small bond issue for road improvement is being advocated in this township.

Grayson county, Va., is waking up in spots. Wilson district is preparing to spend a considerable sum in improving a ten mile stretch of road and one of the state road commissioners was in the county making surveys.

On the return trip through Wilkes, Iredell and Davie, very little sign of road interest was found in Wilkes, while in Iredell were encountered the best roads seen on the entire trip. This county has expended more than $400,000 in building a fine system of sand clay roads and the roads are great.

Especially striking was the government post road, already referred to. This is one of the finest roads in the South today and reflects great credit on the men who built it. It is 30 feet wide, perfectly drained and crowned, with fine wide bridges and beautiful sweeping curves. The top soil surface is laid on twelve to eighteen inches deep at the center and is of the finest quality. The grades are easy and there is a culvert at every spot where a culvert is needed.

Starting in any other direction from Lexington, even more good roads activity may be seen, for the people are aroused on the subject in North Carolina and every community is doing things. What is true of North Carolina is also true of practically every other state in the South. There is good roads interest everywhere.

THE NORTH CAROLINA GOOD ROADS ASSOCIATION.

There are thousands of good roads associations in the land. The South is full of them. Many of these organizations are worthy of the names they bear. Many are purely ornamental affairs, affording an opportunity for certain favored good roads boosters to display their oratorical powers, bask in the sunlight of publicity and enjoy a delightful outing at least once a year at some popular summer resort.

It is a pleasure to be able to state that the North Carolina Good Roads Association is the real thing. It is an organization that has accomplished much in North Carolina. Further than that, it is not an organization that is living in the past, resting on its laurels. It is a forward-looking organization, alive to its purpose in this world and ready for battle all the time.

Since the meeting of 1909, when the association met in Asheville with the Southern Appalachian Good Roads Association, and pledged itself to the securing of connecting highways in the Appalachian region, four fine roads have been built through this region. The association pledged itself years ago to securing a state highway commission. The state highway commission is now an established fact. The association has been active before the general assembly in securing the passage of various bills providing better roads. Among others may be noted the appropriation for the highway division of the North Carolina Geological survey, the Central Highway act, the incorporation of the Charlotte-Wilmington highway, the law authorizing the use of convicts from the state prison on the Hickory Nut Gap road, on the Madison county link of the Central Highway and in McDowell county, the general law authorizing the use of convicts by the various counties of the state, and many others too numerous to mention.

The association is standing solidly behind the state highway commission and will use every power at its command to secure an increase in the appropriation for the support of the commission when the next legislature meets.

If the association does not lose its fighting temper, the next legislature will make an appropriation adequate to the needs of the commission and there is no reason to believe that the association will fall down.

AUTOMOBILE BLUE BOOK FOR SOUTH.

The announcement that the publishers of the Automobile Blue Books are to add a new volume to their present series in order to cover the South, should be of interest to all Southern automobilists, and to all others interested in touring and tourists.

The South needs road maps. The average tourist is not going to travel much in an uncharted region. There is too much risk. The difficulties and privations more than overbalance the pleasures as a general thing and the motorist does not care to risk it.

In North Carolina a large part of the work for the Blue Book is to be done by Dr. Joseph Hyde Pratt, state geologist, who probably knows more about the roads of the state than any other man.

We are glad that this work is being undertaken and hope that it will be pushed to a successful and satisfactory conclusion this summer.

Cost of Highway Maintenance.

That highways constructed with borrowed money should be strictly maintained, is the keynote of a chapter in Department of Agriculture bulletin No. 136, dealing with highway bonds. It has not been customary for officials to face frankly the cost of the maintenance and repair of bond-built highways at the time the bonds were issued and before construction begins. In fact, the authors of the bulletin point out, in the majority of cases where bonds have been issued by local authoritites there has been no provision whatever for maintaining the roads when built. This is perhaps the greatest defect in the method of building highways by issuing bonds.

Maintenance, the highway experts of the Department point out, is necessary in order to insure to the community the maximum economic service by the road, and also to preserve the investment. The cost of maintenance and repairs must, therefore, be studied at the outset. In the absence of general data, the reports on maintenance from states which have highway departments should be of interest to county officers preparing to issue road building bonds.

The following opinions as to maintenance cost represent the results of careful analysis of State highway reports, as well as much first-hand information gathered by the Department's specialists:

Well constructed gravel roads will sometimes sustain several years of traffic without showing marked deterioration even when there has been no maintenance. Such roads sometims even improve during the second season; more frequently, however, they show ruts or the formation of chuck holes. It can not be expected that the average life of a gravel-surface will be greater than that of a macadam surface. The average interval for resurfacing macadam roads is between six and seven years. If a sum equal to two-thirds of the original cost of the gravel surface itself is provided for renewals at six-year intervals, it should be estimated at from $150 to $250 per mile per year. If $30 is then allowed for annual dragging and small repairs, the total annual cost of repair and maintenance of gravel roads would be from $180 to $280 per mile. The annual cost of strict maintenance is sometimes below $30. In Bennington county, Vermont, during 1912, 175 miles of gravel roads were maintained at a cost of $20.70 per mile. The annual cost of maintenance and repair on sand-clay roads, including all necessary resurfacing at periodic intervals, should not be fixed at less than 10 per cent of the original cost.

The cost of repair and maintenance of water-bound macadam roads has been determined with considerable exactness from Massachusetts figures and checked by resurfacing charges in other states and Germany. From $100 to $125 per year ordinarily pays for neeessary small repairs, such as patching, cleaning culverts, etc., and from $400 to $425 per year is the necessary annual charge for resurfacing at periods varying from six to seven years. The sum of $525 per mile, on an average, should therefore absolutely maintain macadam roads if changes and increases of traffic are not excessive. It must be understood, however, that in many instances where macadam sufficed for the vol-

ume and character of traffic prior to 1906, it will not withstand the action of the motor vehicle traffic, which has developed since that time.

Many miles of ordinay or water-bound macadam road have been resurfaced with bituminous materials and many miles of new bituminous-macadam road have been constructed. The logical maintenance of such highways is a surface treatment with bituminous material and rock screenings, clean gravel, or sharp sand. The cost of such surface treatment is from 4 to 12 cents per square yard, and it may be expected to last from one to three years, according to the density of traffic and the success of the application. Theoretically, perfect surface treatment would constitute absolute maintenance for a bituminous-macadam road. Such maintenance is seldom or never realized and bituminous-macadam roads doubtless require resurfacing at intervals. The cost of such resurfacing is not yet known.

The average cost for repair and maintenance of 7,300 miles of highway in Connecticut, Massachusetts, New York, New Jersey, and Rhode Island for the year 1912 was about $800 per mile. A large part of this money was expended for bituminous surface treatment. There is some question whether the expenditure correctly measnres the average cost of repairing and maintaining bituminous-macadam roads. In the state of New York, however, for the years 1911 and 1912 the average cost for repair and maintenance was $724 per mile upon a total average of 2,861 miles. The annual cost of repair and maintenance on Massachusetts state roads for the years 1910,1911, and1912 was, respectively, $642, $647, and $676 per mile for about 850 miles. For the most part these figures for New York and Massachusetts represent the cost per mile of resurfacing with bituminous material and of maintaining bituminous-macadam and water-bound macadam roads by surface treatment with bituminous material. It is clear, therefore, that $700 per mile is not an excessive estimate at present of bituminous-macadam roads.

Automobile Blue Book for the Southern States.

It will be good news to motor tourists throughout this section, as well as to everyone interested in the development of road travel, that the publishers of the Automobile Blue Books, whose headquarters are at New York and Chicago, have decided to add an entirely new volume to their present series in order to more adequately cover the main-traveled motor routes below the Potomac and Ohio rivers. Up to the present time a limited number of these routes have been given as extensions to Volume 3 (New Jersey, Pennsylvania, Delaware and Maryland), or to Volume 4 (the Middle West); but the vast increase in the amount of touring to and from the south, and especially the reeent great progress in road construction throughout the southern states, have made more ample treatment necessary Hence the decision to make a new and separate volume for 1916.

In preparation therefor, one of the Blue Book ears has already started out, and will travel constantly over the main highways of the South Atlantic and Gulf Coast States at least until late in the autumn, taking fresh notes over thousands of miles of trunk-lines and principal connecting routes. This work will be done by men trained during the past fifteen years in the northern and central-western territory, where road guides for the use of automobile tourists have been brought to a high standard of effieiency. With ineidental exceptions, every route deseribed in the Blue Books is traveled, charted and measured by a member of the staff.

Naturally, the first effort will be to connect the principal centers throughout the south by the easiest and best ways, providing new running directions and odometer mileages for 1916 from Washington to Atlanta, Jacksonville and New Orleans; Louisville and Nashville to Chattanooga, Atlanta, Florida and the Gulf of Mexico; Richmond to Asheville, Chattanooga, Knoxville, Nashville and Memphis; New Orleans to Mobile and Jacksonville; and thus generally over the predominant thoroughfares of the southeastern group of states. Next in order will be as many as possible of the secondary and connecting routes, enabling the tourist to reach the majority of places on or nearby the main lines with the least amount of local inquiry, or doubt as to the right way or the correct distances. Gradually, there will also be developed for this territory a series of general index maps, and finally correct district and local maps, by reference to which even the smallest villages can be located and reached to best advantage.

There is no question but that the South is now ready for a large ronte development program of this kind; and that as a result of a new and efficient road guide system for these states, uniform with those of the North and Central West, there will be a very great increase of travel throughout all the territory covered. Experience has shown that for one tourist who will take the trouble to find his own way into and through imperfectly charted sections, easily ten will make such trips after the best and most interesting ways have been made clear by competent field workers, the correct mileages ascertained, and desirable hotels and garages listed. It has also been proven that road improvement follows more rapidly upon routes charted and reeommended by a national organization than any others, for the reason that travel over them increases at a greater ratio, and they receive a generous amount of publieity, some of which reaches throughout the country.

As the different southern states develop trunk lines within their own borders, and to connect with the principal through routes of the adjacent states, it is quite certain that preference will be given to those impartially laid out by the experienced Blue Book staff, especially as the majority of travel will instinctively follow such lines. And if, as thought by some, the federal government is shortly to undertake a systematic plan of co-operation in the establishment, improvement and maintenance of the great national thoroughfares, those most accurately laid down and most heavily traveled are quite likely to receive first consideration.

Not only will the new and complete Blue Book greatly facilitate travel from the northern and central-western states into the south, but it will equally assist the increasing number of southern motorists traveling North or West. At the same time there will be brought to the attention of larger numbers of visitors the scenic and historic attractions of the southern states, which have not been as well and as widely known as they might be. Reeognizing the advantage of eo-operation to seeure the mutually best results in this work, the Blue Book field staff will seek the acquaintanee of interested newspapers, leading motorists, automobile clubs, boards of trade, chambers of eommerce and any others who may desire to see the motor routes of the south measured, described and mapped in the quiekest and most effective way.

Southern Pines, N. C., reeeived bids on August 2 to eonstruct 1000 to 1500 square yards granolithie sidewalk.

GOOD ROADS NOTES GATHERED HERE and THERE

Alabama.

The good roads boosters of the Jefferson County (Ala.) Good Roads Association took part in the formation and organization of the Forrest Highway Association at Rome, Ga. They also went over the proposed road which is 132 miles in distance. The party was cordially greeted in Rome and a banquet was extended to them.

Judge Moses Wright was made temporary chairman of the convention. Mr. J. A. Rountree, Secretary of the United States Good Roads Association was made Chairman on Permanent Organizations and Nominations.

The report of his committee was unamionusly adopted, which is as follows:

The organization is to be known as the Forrest Highway Association.

The highway is to extend from Rome to Birmingham, connecting with the Dixie Highway at Rome and the Jackson Highway, the latter being projected from Chicago to New Orleans.

The following officers were selected: President R. W. Massey of Birmingham, Ala; Vice Presidents, T. J. Simpson of Floyd County, Ga., J. M. Garvin of Cherokee County, Ala; L. L. Herzberg of Etowah County, Ala; N. A. Wood of St. Clair County, Ala; and J. W. O'Neil of Birmingham, Ala.; H. A. Wheeling of Rome, Ga., Secretary and Earl Lay of Gadsen, Alabama, Treasurer.

Board of Directors are J. A. Rountree and Hugh McGeever of Jefferson County, Ala; Jas. L. Herring and F. A. Moody of St. Clair County, Ala; J. L. Savage and N. A. Wilson of Cherokee County, Ala; W. G. Bellinger and J. P. Stewart of Etowah County, Ala; A. B. Arrington and A. N. Tumlin of Floyd County, Georgia.

The Board of Directors together with the officers will have charge of perfecting the organization and pushing the Forrest Highway. Great enthusiam was aroused all along the route and the Birmingham delegation was delighted with the trip and the prospects of seeing this great highway built at an early date.

* * *

Arkansas.

After a 600-mile motor trip from Little Rock to Jackson, Tennessee, and return, County Judge Asher, of Little Rock, Arkansas, is more optimistic than ever of the posibilities of good roads in Arkansas. His trip, on which he was accompanied by Mrs. Asher and his secretary, Alston Fuller, was made in the interest of the Southern National Highway. Going, the trip was made by way of Roe, Clarendon, Helena and thence crossing the Mississippi river, through the eastern parts of Mississippi and Tennessee to Memphis. Returning, Judge Asher and party followed the proposed route of the Southern Highway by way of Forrest City and Brinkley.

"No roads between Little Rock and Jackson are better than Pulaski county roads and few are as good," Judge Asher said. Through the eastern part of Arkansas there are none but dirt roads, which were passable because of the dry weather, but which in rainy season are very bad. Mississippi and Tennessee roads, Judge Asher said, are well graded, but are also devoid of stone and subject to much washing during wet seasons. The streets and boulevards of Memphis are superior to those of Little Rock, Judge Asher reported, but the roads out of Memphis are not nearly so good as those of Pulaski county. Jackson, Tenn., has not a paved street in the city, he said.

The party met with enthusiastic good roads advocates at a number of places along the road, and as the result of a meeting at Forrest City, several miles of roadway will be built in the next few weeks in the northeastern part of the state. In every county passed through in Arkansas, Judge Asher said, road work is now being done.

* * *

Florida.

The board of governors of the State Good Roads Association held an important meeting in St. Augustine on Saturday, July 24, in the chamber of commerce hall. Those present included F. O. Miller, of Jacksonville, president of the association; J. P. Clarkson, of Tallahassee, secretary; the following members of the board of governors; A. W. Corbett, of St. Augustine, chairman, and Major A. B. Small, of Lake City; H. G. Aird, of Jacksonville, and J. C. Hancock, of Stuart, and Judge H. B. Phillips, of Jacksonville, chairman of the legislative committee; John H. Williams, of Jacksonville; J. W. Rast, Duval county; Dr. W. M. Stinson, of Jacksonville; Mrs. O. Brownell, chairman of the good roads committee Florida Federation of Women's Clubs, and special agent of the State Good Roads Association; W. G. Tilghman, of Palatka and Chautauqua beach; Mr. and Mrs. J. W. Sorgen and Miss Sorgen, of Jacksonville; Miss Kate C. Hill, of Jacksonville; Mrs. C. E. Hawkins, of Brooksville; Miss Mary Sherman and Miss Edith Corbett, of St. Augustine; C. S. Young, of Jacksonville, and C. M. Bevan, F. N. Holmes, Frank J. Parker, D. D. Corbett, M. G. Callin, H. T. Sink, Robert Ranson, S. T. Kidder and Harry L. Brown, of St. Augustine.

President Miller announced the following committees:

Legislative, Judge H. B. Phillips, Jacksonville.
Membership, Frank J. Parker, of St. Augustine.
Finance, Dr. W. M. Stinson, of Jacksonville.
Ways and Means, Major A. B. Small, of Lake City.

Committee of arrangements for the next annual convention to be held in St. Augustine in March, 1916, consists of the good roads committee of the St. Augustine Chamber of Commerce.

* * *

Indiana.

The establishment of a state highway department for Indiana and state and federal aid for the construction and maintenance of the arteries of travel are among the chief purposes for which the Indiana State Automobile association has been organized and permanent headquarters established, at the Hotel Severin, Indianapolis.

The plan is to organize the motorists and good roads enthusiasts in all the principal cities and towns throughout the state into local clubs, through field secretaries

sent out to assist the local communities in perfecting their organizations. These local units will, in turn, be affiliated with the state body. It is anticipated that where local clubs are already in existence that these bodies will affiliate with the state association and cooperate with it in every way possible to secure the common ends—the establishment of a state highway department and better roads for Indiana.

A publicity bureau has been established and a state wide educational campaign will be carried on until the next session of the legislature in 1917. This campaign will show the taxpayers of the state of Indiana the saving that can be made with a highway department under the direction of a competent engineer and how a more equitable distribution of the cost of the construction and maintenance of the principal thoroughfares of the state can be effected through state aid.

* * *

Missouri.

The campaign to macadamize the cross-state highway from Kansas City to St. Louis is going steadily ahead and construction work on certain sections of the eastern end will begin soon. That information came to the office of Judge J. M. Lowe, president of the National Old Trails Road association, recently in a letter from Frank W. Buffum, state highway commissioner.

Mr. Buffum has taken personal control of completing the improvement from the eastern boundary line of Boone county to the western end of the already improved section of road leading from St. Charles county into St. Louis. He now is bending his efforts to bring about the completion of the 6-mile stretch yet unimproved in St. Charles county.

His letter to Judge Lowe indicates about half of the stretch will be contracted immediately for completion this fall. Further contracts are to be let then to finish up the work early next spring. That will complete the road from St. Louis to the eastern line of Warren county.

* * *

North Carolina.

Col. Benehan Cameron, of the state highway commission, attended the recent meeting of the North Carolina Good Roads Association at Asheville and on his return home had the following to say about his trip:

"We went to Asheville via Charlotte, King's Mountain and Hickory Nut Gap over an excellent road," said Col. Cameron, "and our return trip was made through the Swannanoa to Old Fort, over the old stage road. From Swannanoa to Old Fort, by the old road, it is only four miles, while by way of the railroad it is over twelve miles, and at Old Fort the railway line passes through a tunnel 150 feet below the stage road, that is three-quarters of a mile in length. But the shortness of the road is due to the fact that it does not take an easy grade but makes right up hill and down hill, instead of going around and taking the easiest way. Consequently there are grades that are almost perpendicular and are impossible of negotiation except for the most powerful machines and horseback riders.

"While we were making our way over the old road we saw one thing that that made our trip seem easier. The new and modern section of the central highway that McDowell county started some time ago, with the aid of the federal post road fund, and which was later stopped because of the exhaustion of the funds, was being worked by a large force of state convicts and with their aid the road will be completed. Where the old stage road only takes four miles to go over the mountains and through the gap, the new road winds up by easy grades for ten miles—and the maximum grade is only 4 per cent, which is said to be a record for mountain roads. Two miles have already been completed and in use, and with the aid of the state assured, the road will be built, and the central highway from Morehead City to the Tennessee line will be a reality.

"Much credit is due the last legislature, which ordered that the state take up this work, and also to Governor Craig. Without their favorable action the Central Highway would never be built, but now in a year or two it will be possible to go from the Atlantic to the Tennessee line on an excellent road."

* * *

Tennessee.

Gov. Rye has announced the three appointive members of the Tennessee highway commission and there is a representative from each of the three grand divisions of the state. The appointive members are: W. H. Crox, Bradley county, East Tennessee; Arthur H. Crownover, Franklin county, Middle Tennessee; Charles W. Williams, Henry county, West Tennessee. The other members of the commission, by virtue of their offices, are Tom C. Rye, governor; Dean Ferris, engineering and highway department, University of Tennessee; A. H. Purdue, state geologist.

* * *

Texas.

With positive assurances of the completion of the Palestine to Houston highway from the Trinity river north to Palestine and with prospects bright for its completion the entire distance within a very short time, an association was organized and officers elected at a general meeting of delegates in Crockett last month.

This highway, which began with the campaign of the Houston Post Good Roads Car party, has created an interest which is unusual and there is not a section except where there is almost a unanimous sentiment for general improvement.

Houston and Harris county were represented at the general meeting by F. P. Chandler, secretary of the Progressive league. Mr. Chandler has taken a great interest in the work and is one of the men behind the new campaign plan which will be directed by the Progressive league.

The officers elected at the Crockett meeting were:

President, Mayor J. W. Young, Crockett.

Secretary, J. D. Freeman, Trinity.

Treasurer, W. G. Darsey, Grapeland.

Vice presidents, W. H. Ward, Houston; Mayor G. A Wright, Palestine; C. W. Nugent, Conroe; W. L. Hill, Huntsville; John C. Miller, Crockett, and W. A. Ball, Trinity.

* * *

Virginia.

Thomas Fortune Ryan, of New York and Nelson county, Va., it is said, is interested in having a modern highway from New York to his Nelson county estate and to help build a road connecting New York with the great southern cities.

The facts have just come out as the result of a visit to Staunton a few days ago of C. L. Scott, engineer in charge of the work in South River district, which issued and sold bonds to the amount of $250,000 to build modern roads, and Supervisor Coleman, of Nelson county, and Superintendent Yates, of the Ryan estate,

Waynesboro people, who have been corresponding with Mr. Ryan.

Mr. Ryan is represented as willing to contribute if the counties through which the road is to pass will do likewise. Influential citizens are ready to co-operate with Mr. Ryan. Nothing is known of the decision as to the best route, but it is regarded as certain that the valley pike for a great part of the way will be used.

* * *

Washington.

Under the public and permanent highway appropriations of the recent Washington State legislature, 424 miles of new roads now are under construction, at a total cost of $2,234,000, according to statistics furnished to the Seattle Automobile Club by Highway Commissioner William R. Roy.

State roads under construction total 217 miles, to cost $900,000, while 207 miles of permanent highways are under construction, at a cost of $1,334,000, Mr. Roy states. The higher cost of the permanent highways is due to the fact that these are all surfacing jobs, while a comparatively small portion of the state roads are being surfaced, and in these cases only gravel is being used.

These statistics do not include maintenance work, work done by the counties under road and bridge or road district funds or by bond issues.

Road Work for Long Term Convicts.

"I believe that it is entirely practical to establish road camps made up of long term men." This conclusion was reached by Warden Sattigan of Auburn Prison, New York, as the result of the season's work of the "Honor Camp" sent out from Auburn prison at the request of the Mutual Welfare League. Eighteen men, of whom five had life sentences, and the others were serving from three to fifteen years, were selected by the league for this camp. All the men came back at the end of the summer with muscles hardened and a new layer of health with which to continue the fight against the killing atmosphere of the prison house.

This road work has been made possible largely through the activity of the National Committee on Prisons and Prison Labor, which brought convict road work before the people of the state so that in 1914 the appropriations included an item for convict road work of which $12,500 was allotted to Auburn prison.

From Auburn Prison 170 men were sent to six road camps. Owing to a scarlet fever epidemic there was delay in beginning the work, the first camp starting out July 9; the sixth on August 12. The work continued until the end of November and the record is entirely creditable to the men, especially when it is remembered that there was no incentive, such as wage, to urge them towards efficiency.

The prisoners throughout the state are proud of the Auburn record which is described in the following detail in "The Star of Hope," the paper published at Sing Sing:

"Camp No. 1, Fleming, N. Y.—Spread one mile of gravel on one road; and constructed one mile of road leading off the state road. This road, twelve feet wide, was graded, and several heavy cuts were made. The base of the road was fieldstone, topped with about fourteen inches of gravel. In its construction two concrete culverts were built, as well as two iron and concrete bridges. The work was neeessarily slow here because of a long haul of gravel from pits three miles from the point where the road was constructed.

"Camp No. 2, Weedsport, N. Y. The men worked on most of the roads in the township picking stone, filling washouts and ditching. Besides this they widened three-eights of a mile of one road, from twelve to twenty feet, and gravelled three-quarters of a mile. They also widened three-eights of a mile of still another road, from 13 to 20 feet, and spread gravel on it. Further they widened another road from 12 to 24 feet, for 1¼ miles, and spread gravel on the same; also they built one concrete culvert 2½X2½X24 feet, and cleaned the brush from ⅛ of a mile of state land and repaired ⅛ of a mile of guard rail.

"Camp No. 3, Ira, N. Y. The work on this road was very difficult. Several hills had to be cut down, and much filling had to be done in roder to make the proper grade. Quite 1¼ miles of road were made, field stone being used as a base. On this gravel was spread 22 inches in depth and 12 feet wide. The cuts made in this construction totaled 600 feet, from 3 to 5 feet of earth being taken from the center of the road. Before this good road was built, a team laden with 1,000 feet of green lumber had to be doubled with another team to move the load in many places. Over the new road one team takes 1,800 of like lumber unaided.

"Camp No. 4, Meridian, N. Y. One mile of macadam road was constructed at this point. Much grading had to be done, necessitating heavy cutting and large fills to reach the grade. This road was constructed of No. 5 stone for a base, then No. 4, No. 3, No. 2 and finally the top dressing puddled in. The material is about 14 inches deep, 12 feet wide, with 4 to 6 feet shoulders on each side.

"Camp No. 5, Throopsville, N. Y. Here 200 feet of retaining concrete walls was built; also a 36 foot concrete and iron bridge. Over 3,000 loads of gravel were hauled and spread; and it is estimated by the town superintendent, that about five miles of road were improved by the men of this camp.

"Camp No. 6, Aurora, N. Y. By these men over 5 miles of macadam road were constructed, with ten to twelve inch bed, 12 foot drive way, with 3 to 5 feet shoulders on each side."

The town superintendents have expressed themselves as highly satisfied with the work, while the residents of the localities showed their appreciation of the work done by the prisoners and of their conduct by furnishing occasional gifts of food, while sometimes a baseball team from the country-side had a game with the men on the Saturday half-holiday.

The National Committee on Prisons and Prison Labor asks that the work be compared with work done by New York State prisoners during the past hundred years, and urges that equal opportunity for labor be afforded to all prisoners in state and county institutions.

It will interest motorists to know that the A. A. A. National Good Roads Board co-operates in every way with the National Committee, the chairman of which is Thomas Mott Osborne, who took the position of warden of Sing Sing prison because of his great interest in bettering prison conditions.

The town of Shepherdsville, Bullitt and Hardin counties, Ky., will build a bridge across Rolling Fork at Shepherdsville, connecting the two counties, at a cost of $16,000.

Baltimore, Md., has awarded contract for 6500 square yards of street paving.

Cartersville, Ga., votes August 14 on $15,000 bonds to improve streets.

GOOD ROADS NOTES IN BRIEF

In Red River county, Texas, White Rock, Annona, English and Clarksville districts, have voted $405,000 bonds to construct roads.

Volusia county, Fla., De Land district, has voted $350,000 bonds to construct roads.

Lee county, Ga., voted $27,000 bonds to improve roads, etc.

Lonoke county, Ark., Road District No. 8, has issued $25,000 bonds to construct roads.

Guadalupe county, Texas, Precinct No. 4, voted $12,500 bonds to improve roads.

Pinellas County Commissioners, Clearwater, Fla., have made plans for extensive highway improvements. They have called an election for August 17 to vote on $715,000 bonds for constructing roads, for ratifying a contract at $616,578.13 to construct 55.99 miles of brick roads, and to provide for other roads, increasing the mileage to 68. The accompanying bridges will cost about $45,000.

Harris county, Texas, will extend paved road seven miles; estimated cost $30,000.

Osceola county, Fla., received bids August 2 on three miles of vitrified brick road with concrete curbing.

Knox county, Tenn., received bids July 28 to construct 88.11 miles of roads.

Crittenden county, Ark., will arrange to construct 10 miles of road.

Pope county, Ark., Road Improvement District No. 1 opened bids August 1 to construct 20 miles of road; issued $150,000 bonds.

Dewitt county, Tex., awarded contract to grade, drain and gravel 9.1 miles of road in District No. 1.

Hardin county, Ky., awarded contract to build four miles of northern end of Dixie highway.

Scott county, Ky., awarded contract to construct 24 miles of state-aid road.

Kaufman county, Tex., Justice Precinct No. 8 awarded contract to construct gravel and concrete roads and bridges; $150,000 available.

Knoxville, Tenn., has awarded $43,251.37 paving contract.

Lonoke county, Ark., Road District No. 8 awarded contract for 4½ miles of macadam pike.

Collin county, Texas, awarded $575,000 contracts for 60 miles of road construction.

Norfolk, Va., has awarded contract for 11,000 feet of granite curbing, etc.

Davies county, Ky., has awarded $24,500 contract to construct 4¾ miles of road.

Baltimore county, Md., has awarded $50,000 contract for street paving.

El Paso county, Tex., votes August 17 on $750,000 bonds to construct roads.

Palmetto, Fla., votes August 10 on $16,000 bonds for streets, etc.

San Marcos, Tex., votes August 17 on $3500 bonds to improve streets.

San Patricio county, Tex., Aransas Pass district, will vote on $75,000 bonds for road construction.

Starke, Fla., votes October 5 on $16,000 bonds to pave streets.

Carter county, Texas, will construct 65 miles of road.

Etowah county, Ala., receives bids until August 5 to construct 3½ miles of Anniston road.

Paris, Tex., has awarded contract for two miles concrete base bituminous surface roads; $50,000 available.

Princeton, Mo., has awarded contract for one mile of cement paving; $30,000 available.

Shelby county, Texas, will build 16 miles of highway.

Havre de Grace, Md., received bids until July 27 for 5500 to 6000 square yards of concrete sidewalk; cost $7000 to $10,000.

McKinney, Tex, will pave streets in District No. 3 at an estimated cost of $62,000.

Mansfield, La., received bids until July 26 for 10,130 square yards brick paving, 3500 linear feet curbing, and other street work.

Perry county, Ala., receives bids until August 9 to grade, drain and gravel about eight miles of road.

New Kent county, Va., received bids until August 3, to construct four miles of sand-clay road.

Jackson county, Ala., receives bids until August 21 to grade and drain about 6½ miles of road.

Tampa, Fla., received bids until August 3 for 93,000 square yards of bituminous macadam street paving.

Gibson county, Tenn., appropriated $10,000 to construct about 70 miles of roads.

Lamar county, Ala., receives bids until August 24 to grade, drain and gravel part of Millport and Vernon road. The county will expend $4616.26.

It is announced from Cold Spring, Tex., that San Jacinto County Road Precinct No. 2 (including Camilla and Shepherd) voted $75,000 bonds to construct roads.

Montgomery county, Va., Christiansburg District, voted $100,000 bonds to construct roads.

Surry county, N. C., Siloam township, voted $25,000 bonds to construct roads.

Marion county, Tenn., voted $100,000 bonds to construct a section of the Dixie Highway.

Livingston, Tex., voted $17,000 bonds to improve roads, etc.

Orange, Tex., voted $325,000 bonds for street improvements, etc.

Brazoria county, Texas, votes August 21 on $150,000 bonds to hard-surface roads.

Cole county, Mo., will vote on $100,000 bonds to improve roads.

Harnett county, N. C., votes August 7 on $25,000 bonds to construct 20 miles of road.

South Boston, Va., votes August 10 on $100,000 bonds for streets, etc.

Piedmont, W. Va., will vote on $36,000 bonds to improve streets.

Cumberland, Md., has awarded contract for 6000 square yards of paving, $22,416.20 for rectangular wood block and $22,624.20 for lug block.

Todd county, Ky., has awarded $17,445.25 contract to construct 4¾ miles of road, etc.

Buchanan county, Va., has awarded contract for two miles of road.

Jefferson county, Ky., awarded $29,000 contract to construct two miles of pike, and $11,575 contract to construct 3¾ miles of Taylorsville road.

Dade county, Fla., awarded contract to construct 26 miles of macadam and chert road.

Pine Bluff, Ark., has awarded $43,202.50 paving contract.

San Antonio, Tex., has awarded 13 contracts for paving 11 streets at total of $361,924.99.

Tuscaloosa county, Ala., awarded $17,000 contract for road improvements.

In Surry county, N. C., Bryan township will vote August 24 on a bond issue of $35,000 for roads; Eldora township on August 10, $20,000; Shoals township, August 10 on $30,000; Westfield township, August 10 on $30,000.

North Carolina and the Movement For Better Roads

By REV. N. M. JOHNSON

THAT North Carolina has taken a leading part in the movement for better roads is evident, not only from the progress made in the various counties of the state, but especially in the state's relation to the Southern National Highway and to the effort to secure Federal aid in road construction and maintenance.

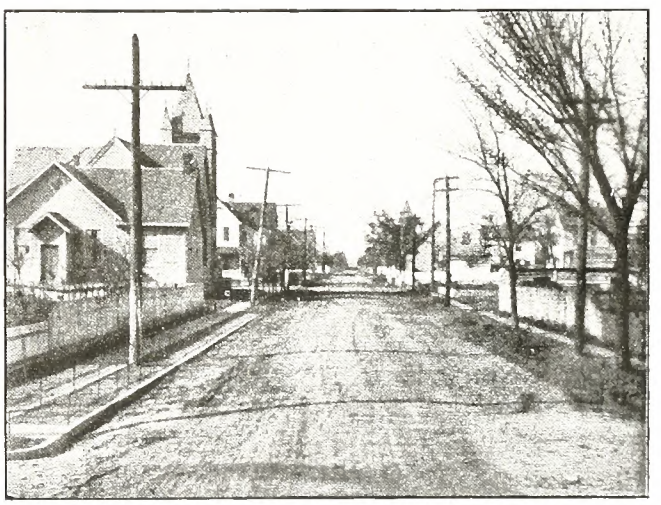
Organized effort to start the Southern National Highway grew out of a conversation between two delegates to the American Road Congress at Atlantic City, New Jersey in October 1912, Col. Dell M. Potter, of Clifton, Arizona and Col. Benehan Cameron, of Staggville, North Carolina. Both were leaders in the cause of better roads, the one in the west, the other in the east. They were discussing the two great coast highways, one skirting the Pacific from San Diego to Vancouver, one bordering the Atlantic, from Quebec to Miami, Florida. Said Col. Potter to Col. Cameron, "Why not connect these two by a highway through the South?" "Precisely what we are doing," said Col. Cameron, "we are building the Central Highway of North Carolina from the Atlantic westward to the Tennessee line, Tennessee is building a cross-state highway to Memphis, and my idea has been to connect these two and extend the road to the Pacific." This was not the first proposal of a southern transcontinental highway, but it led directly and swiftly to the Asheville convention.

Before separating the two Colonels agreed to work together and decided upon a plan of action. Colonel Potter was to organize a provisional Southern National Highway Association in the southeast and the route was to be designated as far east as El Paso, Texas. Col. Cameron was to request the Governor of North Carolina to ask all the southern governors to join in appointing commissioners to meet, select the route westward to El Paso and organize a permanent association. This plan was carried out. In January 1913 in San Diego a provisional Southern National Association was formed with Col. Potter as president, route from San Diego to El Paso was designated and several thousand dollars contributed for the work.

Col. Cameron had no difficulty in inducing the Hon. Locke Craig to request all the other southern governors to join him in sending commissioners to Asheville, February 12, 1913 to designate the route and to organize for work. It is significant that the calling of the Asheville convention was Governor Craig's first official act, since when he has never permitted a single opportunity to further the cause of better roads to pass unimproved. Every governor responded and appointed commissioners, who met at the time and place specified, designated the route, and organized the Southern National Highway Association, with Col. Dell M. Potter, president and Col. Benehan Cameron, General vice-president.

During the two years that have elapsed the progress made has been amazing. Col. Potter has devoted his time, energy, money and ability without stint in untiring efforts, traversing the continent many times and aiding and encouraging the vice-presidents and organizers in each state; to his leadership is due in no small degree the surprising success of the movement.

North Carolina, having almost completed her part of the highway, took the lead in an effort to hasten work on all remaining unfinished links, so that the route might secure some of the 1915 Pacific coast travel. With the General Assembly in session in Raleigh and with three such men as Governor Craig, Col. Cameron and Dr. Joseph Hyde Pratt to lead the movement, it is no wonder that "Resolutions of Greeting to Virginia, Tennessee, Arkansas, Texas, New Mexico, Arizona and California" were unanimously adopted by the general assembly, requesting the co-operation of the eight states each with the rest and all with the federal government in completing the work and in the establishment and maintenance of the road as the Southern National Highway forever. Nor is it any wonder that resolutions of response have already come pledging all that was asked by Virginia, Texas and New Mexico, with telegrams of assurance the similar action will be taken by Tennessee and Arkansas in the near future; and with full expectation that Arizona and California will



Macadam Road Near Norfolk, Va.

do likewise. Fortunately the state legislatures were in session in all the states; and the legislative acts of these several commonwealths officially confirming the work of the Asheville commission settles for all time the route, the name, and the transcontinental character of the highway. Unless the Federal Government refuses to recognize the authoritative act of eight legislatures, it will become not only a transcontinental, but also a national highway, in case the federal government establishes any national highways at all.

Thus North Carolina's initiative seems about to result in an official request of eight states for federal co-operation in the construction and maintenance of roads. The attitude of this state as to federal co-operation is that of a leader. It is not forgotten that when the federal government began to spend money in road construction, it was under the Simmons' Experimental Post Road Law, carrying an appropriation of $500,000. Last November when the administration program, omitting mention of road-legislation, was announced, Governor Craig at once wrote the other southern govern-

ors asking them to join him in writing to the president urging that the Baltimore pledge be redeemed and a Good Roads Bill be passed at the winter session. About all the governors did so. Senator Simmons was selected to secure the legislation. He made a brave fight for an appropriation, but in the closing hours of the sixty Third Congress the appropriation was killed in the senate by Senator Reed Smoot, of Utah, the man whom the women of the United States did not think worthy a seat in the senate of the United States. The outstanding fact is that whatever effort has been made to get congress to continue the work of aiding the states in improving the roads, has been made under the leadership of the Governor and a Senator of North Carolina; a fact that the American Automobile Association through its publicity bureau is making known to the entire nation. Nor has Senator Overman been less zealous in his support of the movement.

With such a record of good works, it was hardly to be expected that North Carolina would fail to create a state Highway Commission. That such a commission has been established, however, is indeed ground for congratulations all around.

Perhaps it is both significant and explanatory of North Carolina's widening influence for road-progress that within the state is published Southern Good Roads, circulating everywhere, but especially throughout the South. The linking of the older south with the Southeast through the Southern National Highway should result in greatly enlarging the circulation of Southern Good Roads especially west of Memphis.

Nicholos county, Ky., has voted $125,000 of bonds to build 250 miles of road.

Thirty States Use Convicts in Road Work.

Thirty states at the beginning of the present year had on their statute books laws providing for the employment of state prisoners in road building.

Arizona, Arkansas, Idaho, Louisiana, Maryland, Montana, Nevada, New Jersey, New Mexico, Ohio, Oregon, Virginia, and Washington follow practically the same system, providing that the control of this work shall be vested in the state highway commission. The highway commission or state engineer makes requisition to the state prison authorities for such number of prisoners as he can use effectively and the prison authorities turn over to him such prisoners as are suitable for the road work.

The prison commission, or board of control of state institutions is held responsible for the development of the convict road work in some nine states: Colorado, Indiana, Iowa, Kansas, Michigan, Missouri, North Dakota, Oklahoma, and Wisconsin.

State prisoners are turned over to the county authorities to be worked on county roads in Florida, Georgia, and North Carolina and South Carolina. This system is not approved by the National Committee on Prisons and Prison Labor, which holds that the state, under no circumstances is justified in delegating the responsibility for its convict wards to county authorities.

The system in New York state is also far from satisfactory, as it divides the responsibility for the construction work and maintenance of the camps between the state highway department and the commissioners of the counties in which the roads are to be built, with the state superintendent of prisons in final authority.

In Utah, West Virginia, and Wyoming the highway department and the prison department co-operate in the control of this work. The prison department is fully responsible for the care and discipline of the prisoners; while the road department is called upon to do the work which it is equipped to do, the building of roads.

The National Committee on Prisons and Prison Labor has found this latter system essential to the successful development of convict road work. The prison department is in a position to care for the prisoners and to handle such matters as food, clothing, housing, medical attention, the affording of educational facilities, and recreation. The highway department cannot be expected to handle these details with the same knowledge as to what conduces to the welfare of the prisoners; yet no prison commission can successfully undertake the building of roads—the work of the engineering experts.

Under a system where the highway department simply hires the prisoners from the prison department, paying for their labor the same amount that it would pay for free labor of the same efficiency the economic and satisfactory development of convict road work can be expected and will result.

Grant county, Ky., awarded $20,172.68 contract to construct first section of Dixie Highway; about 10 miles.

The Hamilton county, Tenn., court has authorized the county finance committee to issue $400,000 of bonds for the construction of a bridge across the Tennessee river.

Thomas Mott Osborne on the "Honor System" of Working Convicts.

"This is the first time I have ever been taken on the level; the wardens trusted me, and I am going to act on the square."

Thomas Mott Osborne, the newly appointed warden of Sing Sing, at a recent Columbia University meeting of the National Committee on Prisons and Prison Labor, emphasized these words from one of the honor men in the Auburn road camp. During the summer Mr. Osborne spent two weeks working with the men in this honor camp, and he assured the large gathering of the committee that he had never had a more wholesome experience.

"The Auburn camp is unique," he stated, "in that men were selected for this work who had long terms to serve so as to put the scheme to the severest test. Out of the twenty men at the camp, five were life term. But of the 20 men at the camp, five were to serve. One man had been nineteen years in prison and had never seen an automobile. Another, a young Italian serving a long term for burglary, had special reasons for attempting escape, as he was innocent of the crime for which he was convicted, his proof of innocence being that at the time when the burglary was committed for which he is serving time, he himself was committing another burglary in a house three blocks away."

"These prisoners were all held to the right," Mr. Osborne explained, "by the realization that they were the representatives of the other four hundred Auburn prisoners." The work done by these prisoners is about the best that has been done in the state, as will be testified to by the residents of the district around Meridan, N. Y., where the work of the camp was done, while it has given great satisfaction to the county authorities.

"You would realize the advantage to society of this method of handling prisoners," he concluded, "if you could see the result in the men themselves. Giving them healthy outdoor work helps to restore their moral tone and is undoubtedly a great help in the improvement of their attitude towards society. The success in the work done by the prisoners of Dannemora, Sing Sing, and Auburn prisons points the way for outdoor work which ought to prevail in all our prisons."

Prof. eorge W. Kirchwey expressed the gratification of the committee at Mr. Osborne's acceptance of the wardenship of Sing Sing prison, as he felt this would lead to the fuller development of the honor system, not only in that institution but throughout the country.

George Gordon Battle, in addressing the meeting on the case to abolish prison slavery under the contract system in Rhode Island, demanded that wages be paid the prisoner for all his labor, both to lift him out of slavery and to enable him to contribute towards the support of those dependent upon him.

"We need this honor work in our county jails," contended Dr. Hastings Hart; "idleness and all its attendant evils prevail in the majority of these county institutions. Labor, and where possible labor out-of-doors, should be developed in all the county jails until such good time as they can be brought under state control."

Carroll county, Mo., is said to be contemplating calling an election on the issuance of bridge bonds to the amount of $200,000.

The commissioners of Sunflower county, Miss., have contracted for a bridge across Sunflower river to cost $30,000.

The commissioners of Monroe county, Ala., will erect a $5,000 steel bridge three miles from Monroeville. Another bridge to cost $4,000 will be contracted for soon.

The commissioners of Carroll county, Ark., are planning to construct a $20,000 bridge across White river.

Kissimee, Fla., votes this month on a bond issue of $10,000 to construct a bridge across Tohopekaliga lake.

On August 19 the city of Miami, Fla., will vote on a bond issue of $150,000 to construct two bridges across Miami river.

Charlton county, Ga., contemplates the erection of a bridge to cost $5,000.

The commissioners of Harrison county, Mo., will build 40 bridges at a cost of $16,000.

Cleveland county, Oklahoma, will build a number of steel and concrete bridges and culverts.

Spartanburg county, S. C., will build 7 bridges at an estimated cost of $10,000.

Wilson county, Tenn., will build four new bridges to cost about $3,500.

Perry county, Tenn., will build a bridge costing $6,000.

The commissioners of Isle of Wight county, Va., will build 7 bridges at a cost of $75,000.

Randolph county, W. Va., will build 4 or 5 bridges at a total cost of about $12,000.

Wetzel county, W. Va., has set aside $15,000 per year for bridge construction and will build 4 or 5 this year.

Lee county, Ga., has voted $75,000 of bonds to build a bridge.

Chatham county, Ga., is planning for a bond issue of $375,000 for bridges and roads.

Pitt county, N. C., will bridge Chicod creek, near Grimesland.

Surry county, N. C., will build a bridge across Fisher's river in Dobson township and three smaller bridges in Pilot township.

Hundred Million For Roads in a Year.

Statistics gathered from the 33 states throughout the Union, in which records are carefully compiled, tell an interesting story of what this country is doing to keep its lines of communication from district to district in the best possible condition.

In these 33 states there are 1,614,999 roads of all kinds. Of these 226,288 are improved, 35,704 miles having been improved during the year 1914. At the rate of 35,000 miles per year, these 33 states will have their entire mileage classed under the head of improved road in less than 45 years. In these states during the year 1914 there were added 6006 miles of new roads. Before the advent of the automobile, such a thing would have been unprecedented, but now it is becoming a yearly occurrence and gathering impetus as time goes on.

These improvements cost $108,191,774. The greatest amount spent by any state was Indiana, which paid out $17,000,000. New York followed closely with $14,638,045; Iowa expended $11,000,000; Colorado spent $9,964,077; Wisconsin paid out $7,000,000; Montana, $8,389,278, and Illinois, $5,500,000.

SOUTHERN GOOD ROADS

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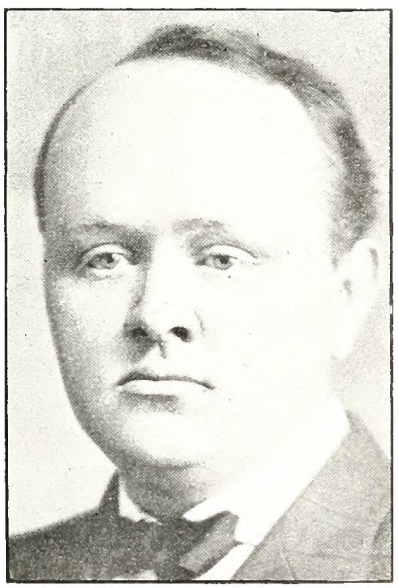
How Good Roads Came to Davidson County, North Carolina

By A. L. FLETCHER, Lexington, N. C.

I HAVE BEEN a citizen of Lexington five years. I came to Lexington September 1, 1910 to become managing editor of Southern Good Roads and it struck me as strange that the official organ of the good roads movement in the South should be published in a county where there were no good roads, a county where mud reigned supreme and the people were unalterably opposed to every move for better roads.

Davidson county is situated in the heart of the great Piedmont section of North Carolina and is rich in nat-



A. L. FLETCHER

ural resources. Its citizens are among the most prosperous in the state, all of them having money in the bank, farms fairly well equipped and good farms. They are of Dutch descent, the most of them, and to the Dutch blood that is in them may be attributed a large part of their ultra-conservatism, their slowness to take on to new things and their unshakable grip on the ways of their fathers. Blessed with the finest climate of any section of the South and with natural resources that cannot be surpassed anywhere on the globe, they were satisfied with things as they were and didn't want anything better.

It would take too much space to tell in detail the advantages that Davidson enjoys over other sections of the South and I will cite only one example that struck me with unusual force when I came to this county in 1910.

Prior to coming to Lexington I had lived in Durham county, North Carolina, where tobacco is the big crop. They are learning to diversify down there but tobacco is still the biggest and best paying crop and Durham soil is better suited to its production, apparently, than to anything else.

For several months before that I lived in a down-east county where cotton was the only crop. The county produces fine corn, too, but cotton is the big crop. Wheat and tobacco will not do well there.

My early manhood and boyhood were spent in Ashe county, North Carolina, high up in the mountains. In Ashe the finest grass and wheat and rye are grown but no cotton and no tobacco. It is not a great corn

Stretch of Road and Concrete Bridge on Central Highway in Davidson County, N. C., Between Thomasville and High Point, Near Kennedy's Mill. Old Grade Was 15 Per Cent, New Grade 4¾ Per Cent. Constructed Under Supervision of Mr. J. F. Mulligan

section, as the nights are too cool for the growing of big corn. The big crop is grass and small grains and the county's great industry is cattle raising.

When I came to Davidson county I was surprised to learn that not only one, but all of the great staple crops of the state reached their finest perfection in

Davidson county. I have even seen growing on the same farm in Davidson county, corn, wheat, cotton and tobacco. Davidson leads the state in wheat production. There is no better tobacco section anywhere, it is an ideal corn country and the very finest cotton, a bale to the acre, may be produced. Davidson also is a great grass section.

So, I take it, that when I say that Davidson has few equals and no superiors in the South, agriculturally speaking, that this bare statement of facts will serve to show why I think so and the average reader will share some of the surprise and wonder that was mine when I came to this county five years ago and found it in the mud up to its chin whiskers and still sinking. It is hard to believe that stagnation could exist in a county so favored by providence but stagnation there was, and lots of it.

And it didn't so much as cause Davidson to bat an eye when the counties all around built good roads and hoisted themselves out of the mud. Forsyth, Guilford, Rowan, Davie—all came out of the mud but Davidson barely grunted and wallowed just a little deeper.

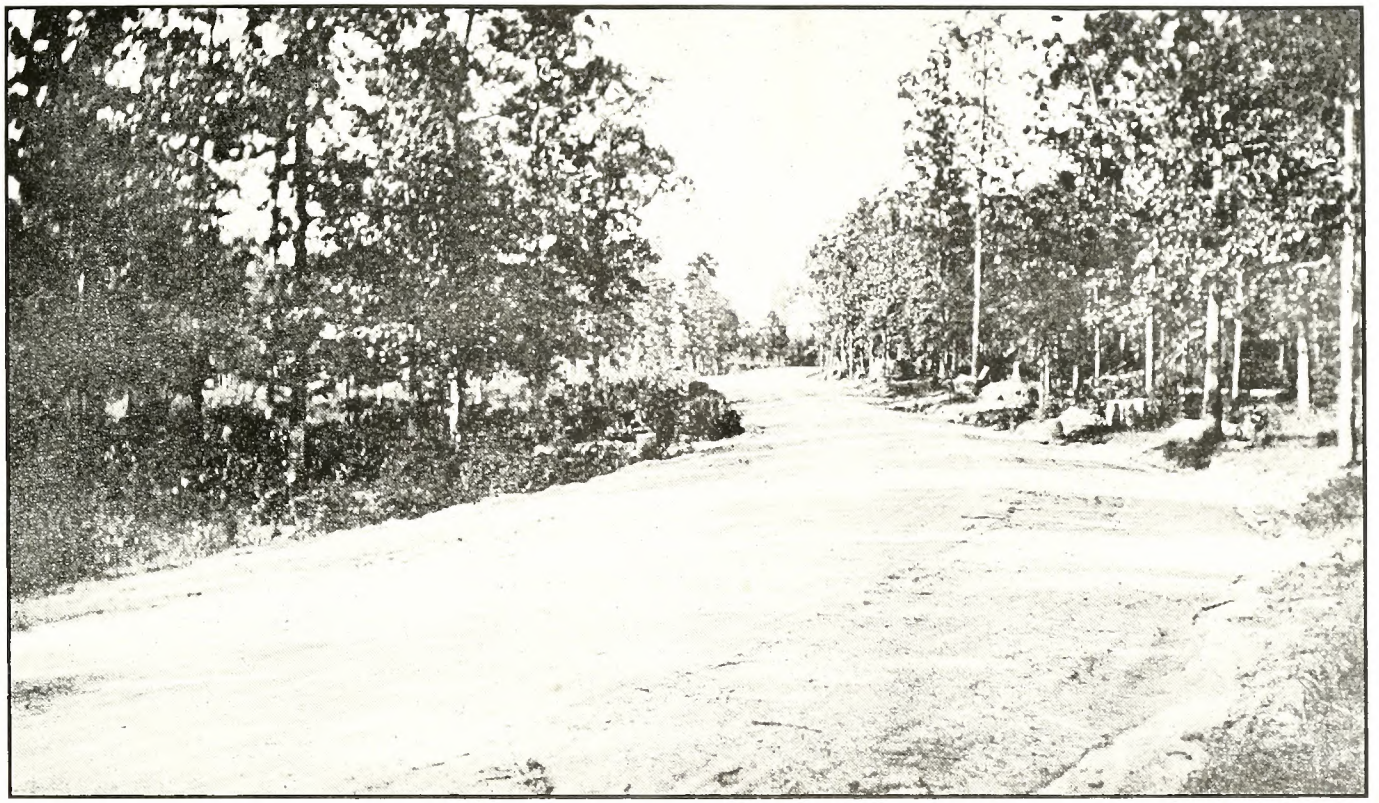
Two or three townships that had seen the light voted special taxes for road work and abolished the old free-labor system. Lexington township established a chain gang and latter voted a bond issue of $100,000. Owing to a defect in the law and other complications, the latter including a board of road trustees who hated bonds and wouldn't move to sell them, the bonds were not sold.

In the spring of 1913 there was a road bond election. An issue of $300,000 was proposed and there was a hot campaign. Governor Locke Craig came to the county and used all of his fervent, matchless eloquence on Davidson's hard-headed Dutchmen but it availed nothing. They were fearfully "sot in their ways" and when the election day came the voters rose up in their might and wrath and fearful was the slaughter. The bond issue was overwhelmed by a vote of more than 2 to 1. In all the length and breadth of the big county of Davidson there could be mustered only a little more than 1,000 voters who favored the bond issue. All of the rest of them were against progress, satisfied with things as they were and against everything that made for progress.

I found it interesting to watch the voters on that famous day when the cohorts of King Mud played havoc with the little band of heroes who stood for better things. The town people were for the bonds mostly, except a few who felt that the towns of the county were already carrying too big a load and that they didn't owe the countryman anything, not even a good road to town.

I remember that when I went to the court-house to

Scene on the State Central Highway in Davidson County, N. C., Constructed by Henderson & Morrow. A Perfect Top Soil Road, in Front of the Old Hayden Place, now Owned by Sheriff Shaw and Postmaster Finch, Lexington, N. C.



Central Highway, Turner Park, Just Outsde the Incorporate Limits of the Town of Thomasville, Looking Toward High Point. A Top Soil Road Constructed Under Supervison of J. F. Mulligan

vote there were lined up on one side of the room a bunch of gesticulating, growling farmers, every man in the crowd as mad a wet hen. Many of them knew me and they knew which way I was going to vote. They looked like they wanted to take me out behind the Temple of Justice and lick me to a frazzle and they would probably have done so if I had said anything about the bond issue. I never saw as mad a set of men in my life and they kept coming up "out of the sticks" all day in exactly the same spirit. All of them were mad clean through and they shot their ballots into the boxes with a spiteful sort of air, as if they were chunking dynamite bombs at their favorite enemies.

When the polls had closed the bond issue was buried so deep that, to quote a frenzied opponent of progress, "the hand of resurrection could never touch it." The faithful little band of good roads boosters went home heart-sick and sore and gave up in despair.

And so it went for two years or more. Mr. H. B. Varner, editor of Southern Good Roads and of The Dispatch, a weekly newspaper, was about the only man in the county who did not give up and he is not the giving up kind. No matter what the people said about it, it was his business to keep on preaching the gospel of progress and he kept on. That the good roads campaign was not lost entirely is shown by the fact that one by one the townships of Davidson county voted special taxes for roads and did away with the venerable farce of "free labor" until only three very small townships remained in the free-labor class.

Then came the legislature of 1915 when the revolution took place. The republicans nominated for the General Assembly Mr. C. H. B. Leonard, of Midway township, and elected him. Mr. Leonard was a native of the county but had been away from the county several years, serving in the U. S. Postoffice Department. He made a good campaign, promised the people that he would represent them in the legislature to the best of his ability and that he would "wear no man's collar." He told them on every stump in the county that he was going to Raleigh to do what he considered best for Davidson County.

He did.

The session of 1915 had dragged on for weeks and was nearing the end when a bill was introduced by Mr. Leonard to create a road commission for Davidson county and authorize and direct that commission to issue bonds for $300,000 for building a system of good roads. Nothing was said about it in Davidson until the bill had passed its three readings in both the Senate and the House and had been duly signed by the proper officials. When it was a law announcement was made and the storm broke.

When the news reached Lexington and percolated out into the rural districts, there was some commotion. The "outraged voters" came to town in droves and they congregated on the streets in angry groups, cussing and discussing the "traitorous" action of the county's representative. There were two indignation meetings in the court-house and men of light and understanding, forgot themselves in the excitement of the moment and "loosed wild tongues." Even mob violence was counseled but nothing came of it. The indignators raised a war fund and set out to contest the matter in the courts. Restraining orders, injunctions and appeals followed until the Leonard Road Bill was declared constitutional and legally sound by the Supreme Court of North Carolina.

When the tumult and shouting had died away, the Davidson County Road Commission organized and got down to business. It is composed of six men, three democrats and three republicans. This makes it nonpartisan and the law provides that it shall continue so.

The county's two big townships, Lexington and Thomasville, each has two members and will continue to have two each under the law. Dr. J. W. Peacock, of Thomasville is chairman and J. W. Lambeth, of Thomasville, treasurer. L. V. Phillips, of Lexington, is secretary. Other members are E. J. Buchanan, of Lexington, T. H. Livengood, of Midway and L. A. Smith, of Cotton Grove.

The commission elected Mr. R. T. Brown, of Orange county, county highway engineer. Mr. J. C. Hicks is his assistant and Mr. J. F. Mulligan superintendent of construction. One road force was outfitted and put to work, the convict gang was better equipped and the remainder of the work was let out to contractors. Owing to the business depression resulting from the European war the commission found it easy to locate road builders who were in need of work and was able to close contracts with them at unusually low prices.

The commission adopted the policy of building roads where the people want roads built and announced in the beginning that not one cent would be paid for right of way or for sand or top-soil for surfacing the roads. Only sand clay and top-soil roads are being built as this type of road is best for this section, mostly easily maintained and the cheapest. The commission has already demonstrated the wisdom of this policy and has been greatly surprised at the interest shown by the people along the proposed roads. Where there was found an obstinate property-owner who refused to give the right of way, his neigbors have signed a bond to indemnify the county against whatever damages may be assessed and the work has gone right on. The law provides that damages may be assessed only after the road has been completed and in operation for sixty days. It also provides that if an unprejudiced board of assessors shall find that the property alleged to have been damaged shall have been benefitted instead the amount of such benefit shall be assessed against the property and collected.

The mileage already constructed is surprising. The contractors have pushed the work rapidly and many miles of good roads are already complete and in use.

Davidson county is coming out of the mud. Travelers on the National Highway and the Central Highway, both of which come through the county, will no longer have cause to curse Davidson's bad roads. It is planned now to have the Central Highway, which passes through the county from east to west, patrolled under the direction of the United States Office of Public Roads. Davidson will equip and furnish two patrolmen, who will work under the supervision of government engineers.

It is good to note, too, that the opposition to good roads among the farmers of the county is dying out. The good roads already completed are the strongest and most effective arguments for good roads. There is no getting around that sort of an argument. No matter how crossed-grained and rantankerous a man is, he can't argue against a success. The roads are doing their own talking these days and everybody is joining the good roads army.

Because of the savings on rights of way and surfac-

Scene on the New Mocksville Road Leading Into Lexington, N. C., Via Southern Railway Depot and Fifth Avenue.
Top Soil Road Constructed by Mr. T. W. Miller With Convicts

First Class Top Soil Road Constructed by Henderson & Morrow on the State Central Highway in Boone Township, Davidson County, Near the Yadkin River, Looking Toward Lexington, N. C.

ing material, the very low prices for grading and careful, pains-taking administration of the county's road business by the commission, Davidson county is going to get a larger mileage of good roads for the money than any county in the state, or, I believe, in the South, has ever got.

There is still some feeling in Davidson county against the bond issue. Not all of the soreheads have got right and it will take some time to get them right but everything is working out satisfactorily. I venture the prediction that five years from today there will not be a dozen men in Davidson county who will "cuss" Representative Leonard. I venture the prediction, also, that Mr. H. B. Varner, whose unfailing loyalty to the good roads cause won for him many enemies in the "late unpleasantness," will rank alongside Representative Leonard as one of the county's greatest benefactors. I will not be in Davidson county to see these men receive the honors and the appreciation that is their due, as my connection with Southern Good Roads and The Dispatch ceases this month, but I expect to hear that my prophecies have come true before I am five years older.

Salisbury, N. C., has voted $20,000 bonds for street improvements and sewers.

Unique Association Formed in Oklahoma

The citizens of Muskogee have started an agitation preparatory to asking the next session of the state legislature for adequate laws under which permanent rural roadways may be built. The Greater Muskogee Association has organized a spade club. The requisites for membership in this club are the ownership of a spade and an automobile. Applicants for membership must agree to carry a spade or shovel with them on their trips in the country and to fill at least one hole in the road on each such trip. When the hole is filled a placard is posted as near the hole as possible bearing the following inscription: "This hole was filled by a Muskogee business man."

It is the purpose of the spade club to have the commercial organizations over the state organize similar clubs.

While the filling of these holes will have only a temporary beneficial effect upon the roads, the effect of the continuous suggestion upon the minds of the law makers should be very beneficial. Following this campaign to create interest a bill will be introduced at the next session of the legislature providing a means whereby the credit of the several counties may, at the option of the voters, be pledged to build permanent roads on the Cardinal Highways.

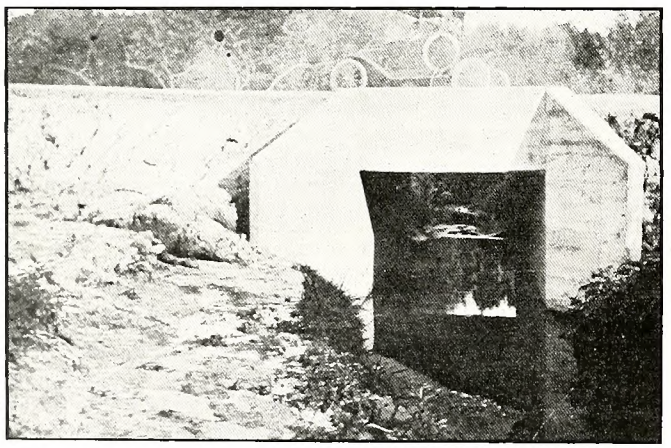
The Southern Appalachian Good Roads Association

By DR. JOSEPH HYDE PRATT, Chapel Hill, N. C.

IN 1909 a Good Roads Convention was called to meet in Asheville, N. C., to which delegates from Virginia, North Carolina, South Carolina, Georgia and Tennessee were appointed. The object of the convention, as stated in the call, was to provide ways and means for the construction of a system of roads in the Southern Appalachian Region, with connecting roads extending down into the Piedmont sections of the several states.

There were over three hundred road enthusiasts who attended this convention, and before its close they had organized the Southern Appalachian Good Roads Association, whose object was the same as that given in the call of the convention.

The association has right from the very beginning tried in every way to assist the several states represented in the association in obtaining a system of good roads, or more particularly to assist in the construction of interstate and intercounty roads. The association has held annual conventions each year since 1909 at Knoxville, Tenn., in 1910; Roanoke, Va., in 1911; Atlanta, Ga., in 1912; Asheville, N. C., in 1913, and Bristol, Va-Tenn., in 1914.



First Concrete Culvert Built on State Central Highway Between Thomasville and High Point, N. C.

Since the organization of the association the following additional states have become interested in its work, Kentucky, West Virginia and Alabama.

At the time the association was organized there were very few counties in any of the states that were connected by good roads with the adjoining counties, and there were no interstate roads that could be classified as good roads. The work of the association in arousing interest in the construction of intercounty and interstate roads, and in creating sufficient enthusiasm and demand for these roads as to cause the counties to issue large sums in bonds for the construction has been phenomenal. Good roads are either completed or in the process of construction leading from the Piedmont sections of Virginia, North Carolina, South Carolina, Georgia, Tennessee and Kentucky into the Southern Appalachian mountain region. These roads have been for the most part very carefully located, and with grades in most instances not exceeding 4½ per cent. They are being constructed with sufficient width so that it is possible for automobiles and teams to pass each other without it being necessary for one to stop or go into the ditch.

The result of the construction of this Southern Appalachian system of highways has enormously increased the number of automobiles coming into this section. As an illustration the Hickory Nut Gap, or Charlotte-Asheville highway, which has just been opened to automobile traffic this summer, has had as high as 110 automobiles a day pass through the Gap, and thus far automobiles from 27 different states have been over the highway. Two years ago two or three automobiles a year was the record, and usually they had been taken over the road and through the Gap simply for their owners to be able to say that they had gone over that road.

This association has co-operated in every way possible with the different State Good Roads Associations, and the results accomplished are undoubtedly due to the close and sympathetic co-operation that has existed between the several associations.

Where it has been necessary to supplement state or county funds in order to obtain the construction of a certain link of road, different members of the association have organized themselves into committees and assisted in raising the necessary funds.

The association has also assisted in obtaining the passage of bills creating State Highway Commissions in North Carolina and Tennessee and hopes and expects in the near future to be successful in obtaining the passage of similar acts in South Carolina and Georgia.

While there are still many miles of road to be built in the Southern Appalachian Region before the system of roads advocated by the association is completed, yet this is not now the most important work of this association. There is but little trouble at the present time in providing revenue for the construction of roads, but the big problem is providing revenue for the maintenance of the roads after they are constructed; therefore at the annual meeting of the Association to be held at Bluefield, W. Va., October 14-15-16, 1915 the main subject that will be discussed will be maintenance of public roads. It is hoped that the Association will be able to arouse in its members, and through them transmit to the counties and states which they represent, a feeling of responsibility for the upkeep and maintenance of the public roads. If the Association can do this they will have done as much for the cause of good roads as they have already accomplished in the construction of a system of roads in the Southern Appalachian Region.

It may be interesting to give here a list of the highways that the Association has been advocating, and their present condition.

Charlotte-Asheville, or Hickory Nut Gap Highway. This highway is open to automobile traffic, although a portion of it has not yet been surfaced and becomes somewhat sticky in wet weather. The State of North Carolina has assisted in the construction of seven miles of this highway by furnishing State convicts to work

on this link. Members of the Association assisted in raising the revenue that it was necessary to have to supplement the work of the convicts.

Spartanburg, S. C.,-Asheville Highway. This highway has been completed and was open to any kind of traffic during the past year. The highway goes via Tryon, Saluda and Hendersonville, N. C., it is surfaced with sand-clay or gravel most of the distance, and can be travelled at any time.

The Greenville, S. C.,-Hendersonville, N. C., highway. This highway has been open for traffic; and on the North Carolina side has been completed and surfaced for most of the distance. In South Carolina Greenville county has recently issued a large amount of bonds for road construction, and will revise their link of this highway, putting it in much better condition than it is at the present time. The highway is, however, open for traffic at all times.

The Central Highway of North Carolina. The Central highway of North Carolina, extending from Morehead City on the coast to the Tennessee line passes through the Southern Appalachian Mountain Region, and includes two links of highway that have been advocated and worked for by the Association. The link leading from Asheville via Swannanoat Gap into the Piedmont sections of the state is now completed with the exception of about 3½ miles just east of the Gap. These three miles are now being constructed, and the state of North Carolina is assisting in its construction by having detailed state convicts for this purpose. The old road leading from Swannanoa Gap down the mountain for a distance of three miles, has been repaired and put in shape so that automobiles and others are using the highway. The new road will be completed within the next few months. The Western link of the Central Highway from Asheville to the Tennessee line, via Madison county, has been completed, with the exception of about three and one-half miles, which is now being built. The State of North Carolina is also assisting in the construction of this link of the Central Highway through the use of State convicts. It is not possible yet for automobilists to make the trip in any comfort from Asheville to the Tennessee line, but by another season this road will be open and can be used at all times.

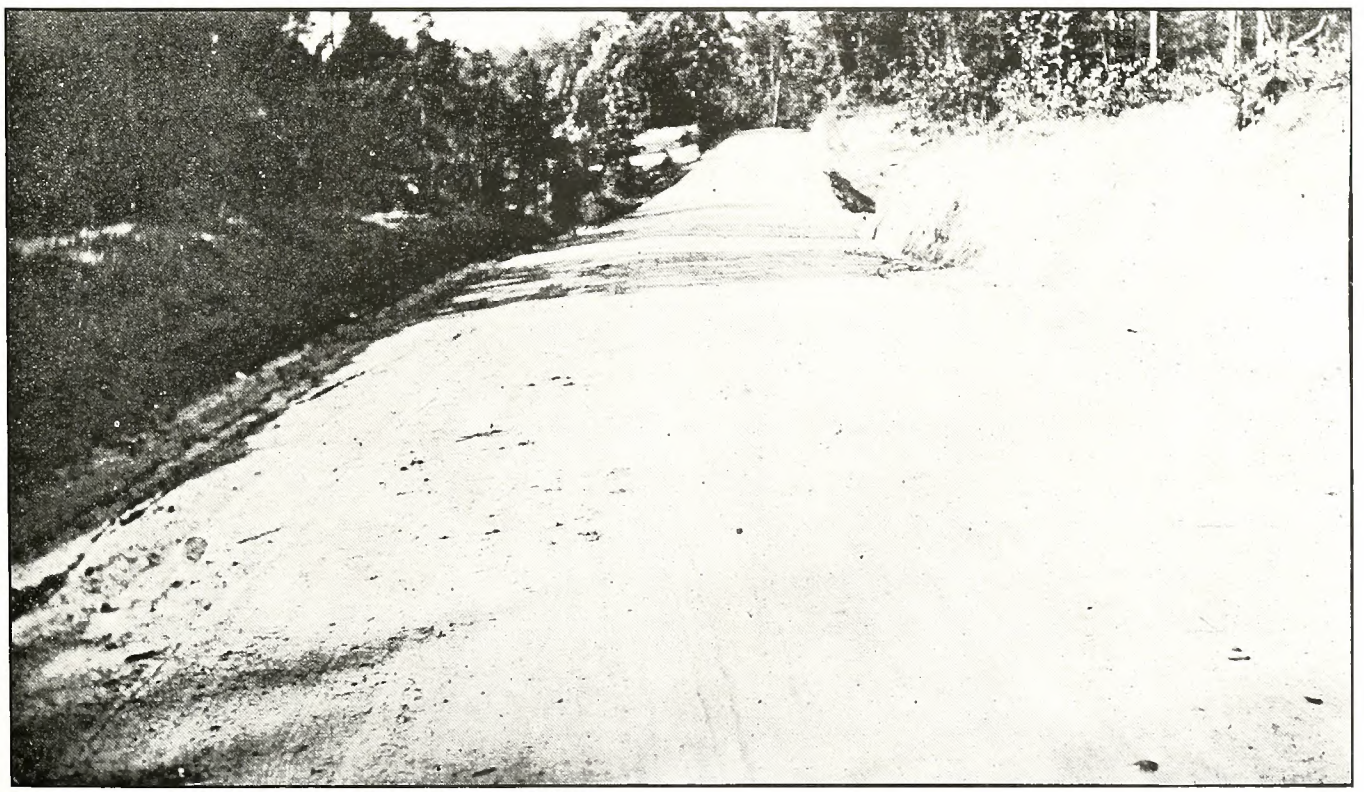
Very recently Cocke county, Tennessee has issued bonds, and out of the issue the county court appropriated $37,000 for the construction of the highway from the North Carolina line to Newport. At the line the highway connects with the Central Highway of North Carolina. The county court has practically agreed to build first the three miles beginning at the North Carolina line, and when completed it will open a good road through from Asheville to Knoxville, Tenn.

Another entrance into the Southern Appalachian mountains that the association has been striving for is from northeast Tennessee and southwest Virginia, and provisions have now been made by which this will be accomplished. During the past year Avery county and certain townships in Mitchell county, North Carolina and Carter county, Tennessee, have passed bond issues for road construction, and work is now going on along the route of a through highway from Elizabethtown, Tennessee, to Asheville, N. C., via Elk Park, Cranberry, Newland, Sprnce Pine, Burnsville and Mars Hill. This road should be open as an interstate highway by next summer.

The Bristol to Washington Highway, via Roanoke, Va., has been constructed for nearly the entire distance, and will open a route into the Southern Appalachian mountains, as Bristol and Elizabethtown are already connected by a good road.

Provisions have also been made for the opening of the Bristol-Cumberland Gap Highway and the Boone Highway through Kentucky.

The General Assembly of North Carolina of 1915



A Magnificent Stretch of Top Soil Road on the State Central Highway Running Through Davidson County, N. C., Between Thomasville and Lexington, Constructed Under Supervision of Mr. J. F. Mulligan

passed an act authorizing the construction of the Asheville-Murphy Scenic Highway, which will be extended into Georgia and open up another entrance from Georgia into the Southern Appalachian Region. Provisions have already been made by bond issue and otherwise for the construction of all but a few miles of this highway, and the work is now going on.

At Franklin, Macon county, N. C., through which this Asheville-Murphy Scenic Highway passes, another highway is being considered via Tallula Falls to Atlanta, Ga.

With the full completion of these highways, so that they can be advertised as open at all times through the year for automobile traffic, there will undoubtedly be an enormous increase in the automobiles that will come into the Southern Appalachian Region. This in turn will mean a very large increase in the market for the largest assets of this region such as climate, scenery and good water.

Mr. Henry Roberts of Bristol, Va., is chairman of the committee of the association on construction work, and will make a report at the Bluefield, W., Va., meeting on what has been accomplished during the past year in the actual construction of highways in which the association is particularly interested. There has probably been a great deal more done in the past year than any other year since the association was organized.

Anyone who is interested in the construction of good roads is cordially invited to attend the meeting of the association at Bluefield, W. Va., October 14-15, 1915. It is expected that this meeting of the association will be as largely attended and as interesting a session as any in the history of the association.

Greenwood, S. C., has voted $100,000 bonds to pave streets.

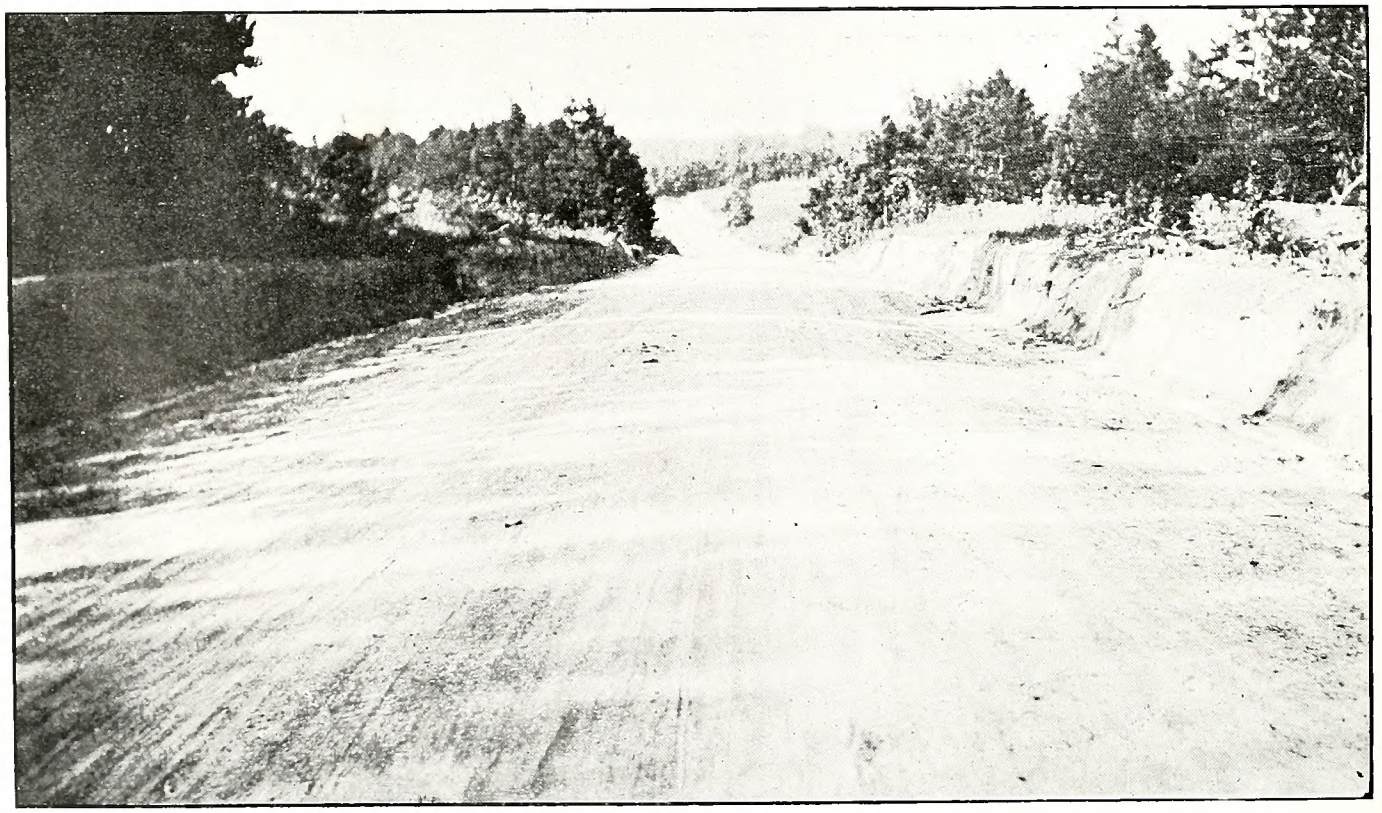
Contractors at Pan-American Road Congress.

In addition to delegates and others officially appointed by the heads of governments, states and cities, and a large number of state and local highway officials who have been invited to attend the Pan-American Road Congress, approximately five thousand contractors have received special invitations to be present and participate in the proceedings. Each of these contractors has been supplied with a copy of the advance program, and the rapidly increasing number of expressions of intention to attend the Congress is especially significant.

The attendance and interest of those who perform the actual work of construction of roads and streets has been noted at the previous annual conventions of both the American Road Builders' Association and the American Highway Association, and especially at those sessions which included the discussion of practical or technical construction. The fact that this year these two great associations have joined forces in organizing the Pan-American Road Congres, with its comprehensive program, and with expert road builders and engineers of the highest standing to prepare papers and lead discussions, makes it certain that the latest and most thoroughly scientific information will be presented, the value of which cannot be over estimated.

Contractors and all others interested will be entitled to participate in the proceedings; and on the payment of a small fee, if desired, receive a copy of the complete report when printed. This report, containing the papers and discussions in full, will constitute a virtual text book on road and street construction, maintenance and administration, with the methods and practices brought down to date.

The Pan-American Road Congress will assemble at Municipal Auditorium, Oakland, California, Monday, September 13, and continue five days



Beautiful Stretch of Top Soil Road on the Central Highway, in Davidson, County, N. C., Between Thomasville and High Point, Constructed Under Supervision of Mr. J. F. Mulligan

Road Work of Hamilton County, Tenn.

By HAL F. WILTSE, Chattanooga, Tenn.

When the present fiscal year has ended, Hamilton county, Tennessee, of which Chattanooga is the county seat, during the year will have completed, or will have well under way to completion, highway construction costing a total of more than one million dollars. All projects within this total are in the immediate vicinity of Chattanooga, but tend to improve traffic facilities to surrounding towns and farming territory.

Already during the year road work to the extent of $128,000 has been completed and is in use.

Work already begun or about to begin aggregates the sum of $896,000.

If the Main street bridge is added the total will be increased by at least half a million more.

Already Completed.

The work already practically completed comprises the following:

Main avenue (three contracts)	$ 45,000
Walnut street bridge (repairs)	70,000
Bird's Mill to Chickamauga	2,500
McBryant road	1,500
Dobbs avenue	1,000
Harrison Pike	8,000
Total completed	$128,000

Now Under Construction.

Bell road	$ 3,000
Cassandria Smith road	1,500
Avenue K, East Lake	3,000
Market street bridge	700,000
Riverside drive	25,000
Lauderbach to Glass street	25,000
Wauhatchie Pike	125,000
McCallie avenue	14,000
Total under way	$896,500
Total for year	$1,024,500

Concerning the new roads now under construction or about to begin, two will be of concrete.

The first of these is the short aproach to the Missionary Ridge tunnel, being constructed by Superintendent Crox under the direction of the highway commission.

The other is being constructed by contract under the supervision of County Engineer Bryan and direction of the Lookout Mountain Pike Commission. The different management is caused by the provisions of the various bonds issued under which the funds have been provided. This pike will be what can be styled a "commercial road," accomplishing the same purpose, with practically no grade that now is accomplished by a steep but very scenic road over the "bench" of Lookout Mountain on the route to Nashville, etc.

All the work mentioned above is the result of bond issues, none being constructed out of current revenues.

Riverside Drive will be primarily a utility road, providing a much more direct route than any that now exist between Chattanooga and important suburbs such as East Chattanooga and Avondale. There are a number of factories in these districts. The road will help to develop large tracts suitable for industrial and residential purposes. Incidentally it will be a delightfully scenic addition to the pleasure roads of the vicinity. It is close to, and as parallel with the Tennessee river as engineering considerations permit. It will be macadam for the present, but ultimately there is little doubt it will be given a concrete slab.

There is some divergence of views between County Engineer Bryan and Supt. Crox as to the best and cheapest methods to be employed in construction of concrete roads. These are practically new to most engineers and approved and settled methods have not been crystalized.

According to Engineer Bryan, the work should be completed the entire width of the roadway as the builders go along. The joints between the sections should be reinforced with steel to protect the exposed edges and the interstices between the sections left from one-half to three-fourths of an inch, to take up the slack in expansion due to difference in temperature.

A departure from what the public has been accustomed to in highways will be seen in the Wauhatchie pike, where Engineer Bryan has specified that the crown of the road shall present a curvature of only two and a half inches. That is, the center of the road in place of being some six or eight inches higher than the sides as in chert roads, will be only two and a half inches higher. At the center the concrete will be two and a half inches thicker than on the sides, the roadbed or grade being level.

The county superintendent is pursuing a different method in the work on McCallie. The road, completed, will be 36 feet wide. He will construct first a road 18 feet wide, leaving the remainder to be used for traffic. When this concrete has set sufficiently he will throw it open for use and construct another road 18 feet wide alongside the first one, leaving a completed road of full 36 feet for use. There will be no steel binder or reinforcement in this road. The two edges will be put together without an expansion joint and will be fitted as closely as possible, leaving no space between them. The roadbed will be perfectly level latterally and the concave surface after the concrete has been laid will not exceed an inch and a half. He is, however, considering the question of making the drainage to the center. If this plan is adopted, the surface in place of the familiar concave will be convex, so that the water will run to the middle of the road and be carried off at designated points. It is thought that this method, if adopted, will entirely prevent the cracks that appear latterally in much of the concrete pavement laid by expert persons, because the weight of the concrete will be by gravity toward the center and will not tend to pull it apart. A convex street is also an economy in that it saves the expense of gutters on either side.

An argument against the use of what is called expansion joints in concrete streets is found in the statement that nearly all are laid in warm weather, and while they may contract with cold, there is little chance for them to expand with heat. Again, it is said that if the concrete contracts in cold weather, water will enter at the joints and in freezing will force the seams apart. For this reason, it is argued that the surface of any concrete pavement should be as near continuous as is possible and no opportunity afforded for water to enter the joints and by freezing force it apart.

Geneva county, Ala., will grade, drain and surface with sand-clay part of Hartford and Wicksburg road; expenditure $4616.26.

The Jackson Highway

By MISS ALMA RITTENBERRY, Birmingham, Ala.

IT IS USELESS to give a detailed statement of how the Jackson Highway originated. It is recorded that the Alabama Daughters of 1812 were the first to take the initiative in planning, launching and building a Transcontinental Highway from Chicago to Mobile, and on to New Orleans; connecting the Lakes and the Gulf; a big broad road splitting the Middle Basin and traversing the states of Illinois, Indiana, Kentucky, Tennessee, Alabama, Mississippi and Louisiana; as a monument to Andrew Jackson in commemoration of his military triumph and civic achievement.

The committee of which I have been chairman for four years has been untiring in its efforts to create sentiment and arouse interest in the building of this highway, connecting the Lakes and the Gulf, as a monument to Andrew Jackson. The best factor of aid has been the press. The purpose of the committee has been to stimulate interest in the Jackson Highway as a monument to Andrew Jackson, to connect the Lakes and the Gulf in a commercial way, bringing the North and the South into more neighborly relations, to advocate and by example push a policy of "road education," to arouse interest in the cities and country, to particularly show the coming generation the value of "roads as monuments," to keep away from politics and sectionalism, and the plan of building was from county to county, state to state, to arouse enough interest along the selected route to get the counties to issue bonds and repair the old North and South turnpikes and build in the missing links.

In our work we are in perfect accord with the ideas of the Director of Public Roads who says that "it is not only my hope but belief that every state will eventually adopt a system, the most important essential of which will be the Trunk Line Road supplemented by intercommunicating roads, in which a gradnated system of state control will be exercised and which will receive state aid according to their importance."

The Jackson Highway is the Trunk Road through the states from Chicago to Mobile on to New Orleans and the committee in its earnest efforts in the behalf of the Jackson Highway were equally pledged to get the convicts out of the mine and placed on the public roads, especially in Alabama.

The women of the different patriotic organizations, the Colonial Dames, Daughters of the American Revolution, Daughters of 1812, and Daughters of the Confederacy, have in the last 8 or 10 years become aroused to the importance of preserving the historic points of interest and marking the old roads and trails. The Daughters of the American Revolution have given valnable aid in their work of research in helping to compile the war records of the war of the Revolution. The National Society of the United States Daughters of 1812, State of Alabama, are alert to the importance of the work that belongs to their period. Their organization is one of the youngest but their field of work is fertile as nothing had been done to mark one of the most important periods in American history, so the Alabama Daughters of 1812 have undertaken the most ambitious interprise of any patriotic organization. They launched the project of this Transcontinental Highway from Chicago to New Orleans, splitting the Middle Basin, the Highway to follow the old historic roads and trails of that period as nearly as was practical but it is impracticable to leave out trade centers in building a national highway.

In all patriotic organization work of this kind, with no financial backing, it is a long drawn out persistent work, you always meet with more or less indifference and more or less opposition. As chairman I have tried from the very beginning to interest the various commercial bodies in the different cities through which the Jackson Highway passes. They all endorsed the proposition and assured me of their hearty support and cooperation. But, oh, they seem so long in giving it.

The main line of the Dixie Highway is going through Eastern Kentucky, East Nashville, on to Atlanta and down to Miami. As chairman of the Jackson Highway Committee I was asked by Col. Shook, the Nashville, Tenn., delegate of the Dixie Highway Conference, to join with him in his effort to get the Dixie Highway through Nashville and connect the Jackson Highway with the proposed Dixie Highway at Nashville. I refused to go with him, but a delegation from the Birmingham Chamber of Commerce went to Chattanooga to bring the Dixie Highway to Birmingham. They heard the air of Dixie played by the band through the streets of Chattanooga. This delegation has become strong and ardent supporters of the Jackson Highway coming through Birmingham and they do not care whether the northern terminus is Kalamazoo, Michigan, or Ishkoota, Ala., or through what cities it passes just so it passes through Birmingham.

As all of you must know there is no monument to Andrew Jackson in the state of Alabama, the state he redeemed from savages and gave to civilization. There is only the equestrian statue in the capital grounds at Nashville and the Hermitage between Chicago and New Orleans. So it was suggested by the Alabama Daughters of 1812 that a monument be erected to the memory of Andrew Jackson and that the most suitable monument would be a beautiful road stretching down through the Middle Basin from Chicago to New Orleans connecting the Lakes and the Gulf. There cannot be built a greater or finer monument to the memory of man than a National Highway, a monument that benefits the living while honoring the dead. Eight National Highways were proposed in congress, not one to the memory of Andrew Jackson nor was one proposed to traverse the Middle Basin between the Blue Walls and the Rockies, connecting the Lakes and the Gulf.

The building of this monument is not the work of any good roads association or the commercial bodies along the route, it is the work of the Alabama Daughters of 1812.

Nelson Page says that "the Southern man wept for the loss of his wealth, the Southern woman wept for her dead." The rehabiliation of the South is due in a great part to the spirit, the indominatable courage, the self sacrifice, and the fortitude of the Southern woman. The Daughters of the Confederacy built the monument to Jefferson Davis in Hollywood, Richmond, built the monument to the Confederate dead in Arlington, but the greatest monument of all is the Jackson Highway from Chicago to New Orleans, connecting the Lakes and the Gulf in a commercial way and bringing the North and the South in a more neighborly relationship and into closer bonds of friendship and brotherly love.

Meeting of Jackson Highway Association

By WILLIAM C. RADCLIFFE, Temporary Secretary

AN ADJOURNED MEETING of the Jackson Highway Association was held on Friday, July 30th, at 2 p. m. at Birmingham, Ala., for the purpose of receiving the report of the committee on temporary organization, Miss Alma Rittenberry, chairman.

The meeting was called to order by Chairman, and it developed that Miss Rittenberry had not arrived. Owing to the fact that several members of the conference were obliged to leave on early afternoon trains, the report of the temporary organization committee was made by temporary secretary, Wm. C. Radcliffe, as follows:

"It is the unanimous recommendation of the committee on temporary organization that this association be known as the Jackson Highway Association, to promote a highway from Chicago on the northwest and from Buffalo on the northeast, to New Orleans.

"It is the unanimous recommendation of the committee on temporary organization that the following temporary officers be chosen at this meeting:

President, two vice-presidents from each of the following states: Kentucky, Tennessee, Indiana, Alabama and Louisiana. Two honorary vice-presidents from Alabama. Secretary (to be named by the temporary president.)

"The committee recommends the election of the following temporary officers of the Jackson Highway Association:

President—P. L. Atherton, Louisville, Kentucky.

Vice Presidents—

For Kentucky—Emery C. Dent, Allen county, and E. L. Quarles, Lexington.

For Indiana—Walter H. Crim, Salem. Second member to be named later.

For Alabama—W. S. Keller, Montgomery and John Craft, Mobile.

For Mississippi—F. E. Cottrell, Gulfport, and Walter Gex, Bay St. Louis.

For Tennessee—J. G. Creveling, Nashville and Ben Childers, Pulaski.

For Louisiana—Leon Schwars and C. H. Ellis, New Orleans.

"The committee recommends that the temporary president be empowered to select a temporary secretary, for the reason that it seems almost necessary that the secretary be in the same town with the president.

"The committee recommends the election of the two following honorary vice presidents—Miss Alma Rittenberry and Mrs. J. Morgan Smith, both of Birmingham.

"It is the unanimous recommendation of the committee on temporary organization that this meeting go on record as giving full recognition to the National Society United States Daughters of 1812, state of Alabama, as having taken the initiative in planning and launching the highway from the Lakes to the Gulf, naming it in honor of Andrew Jackson.

"And further, that the minutes of this meeting shall record the fact that Miss Alma Rittenberry, of Birmingham, originated in 1909 the idea of this transcontinental highway and was appointed chairman of the work by the daughters of 1812, state Alabama, on May 25th, 1911, and has diligently worked in the interest of its plans and purposes.

"And further, that in the minutes of this first meeting of the Jackson Highway Association shall be recorded the first annual report made by the chairman of the Jackson Highway, Miss Alma Rittenberry, on October 31st, 1911, to the president and board of directors of the Alabama Daughters of 1812."

The report of the committee was unanimously adopted and Chairman Milner called Temporary President Atherton to the chair amidst applause. Mr. Atherton stated that he did not desire to make an address, but felt that the thing to do was to discuss the plan of work.

Mr. Kennedy moved that the temporary officers be made the temporary executive committee and that they be empowered to fix the time and place for the next meeting and that at that meeting a constitution and by-laws be offered for adoption. The motion was carried.

President Atherton asked if any one had thought of plans for raising funds. A general discussion followed, wherein Mr. Halle sugested that an effort be made to interest automobile manufacturers and dealers in the Jackson Highway.

Mr. Manier, speaking for Nashville, invited the Jackson Highway Association to hold the next meeting in that city; Mr. Craft thought the meeting should be held in Birmingham. Mr. Kennedy suggested that New Orleans should not be overlooked in considering the next place of meeting. Mr. Kennedy suggested that the matter be handled by the executive committee. Mr. Radcliffe stated that Birmingham would be happy to have the next meeting, but that there was no disposition to press the matter unduly.

Mr. Kennedy, who was leaving to take the train home, pledged the suport of Montgomery to the further work of the highway, and stated that the Montgomery Chamber of Commerce has been active in a movement which will bring the scout men of the automobile Blue Book into Alabama in the fall for the purpose of making road notes of the various highways.

Mr. Manier suggested that a strong effort be made to obtain a large attendance at the next meeting and suggested that invitations be sent out by the governor of the state in which the meeting might be held.

Judge Skeggs of Decatur and Mr. King of Pulaski, expressed themselves as favoring Nashville for the next meeting.

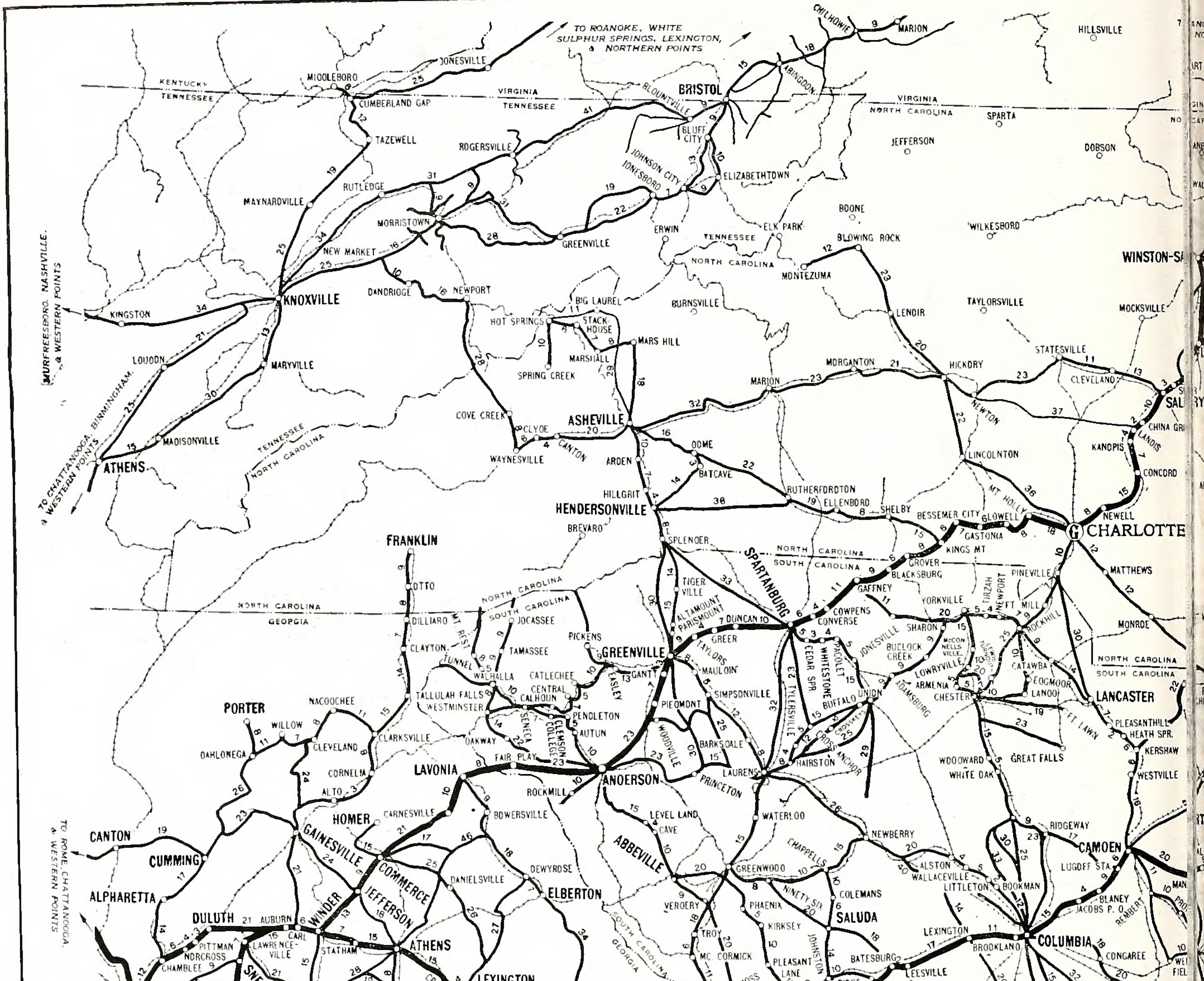
In a further discussion of methods of providing funds for construction work, Mr. Manier urged that no consideration be given any route unless a valid guarantee of the county or of responsible individuals is given the Jackson Highway Association. Mr. Atherton suggested that this be discussed at the next meeting.

Mr. Atherton was asked to give estimate of the annual expense of maintaining the organization. He expressed the belief that it could be done for $6,000 to $7,500 per year, which would include the salary of a capable secretary and the services of a stenographer.

It was suggested that some automobile company might be willing to furnish an automobile for field work.

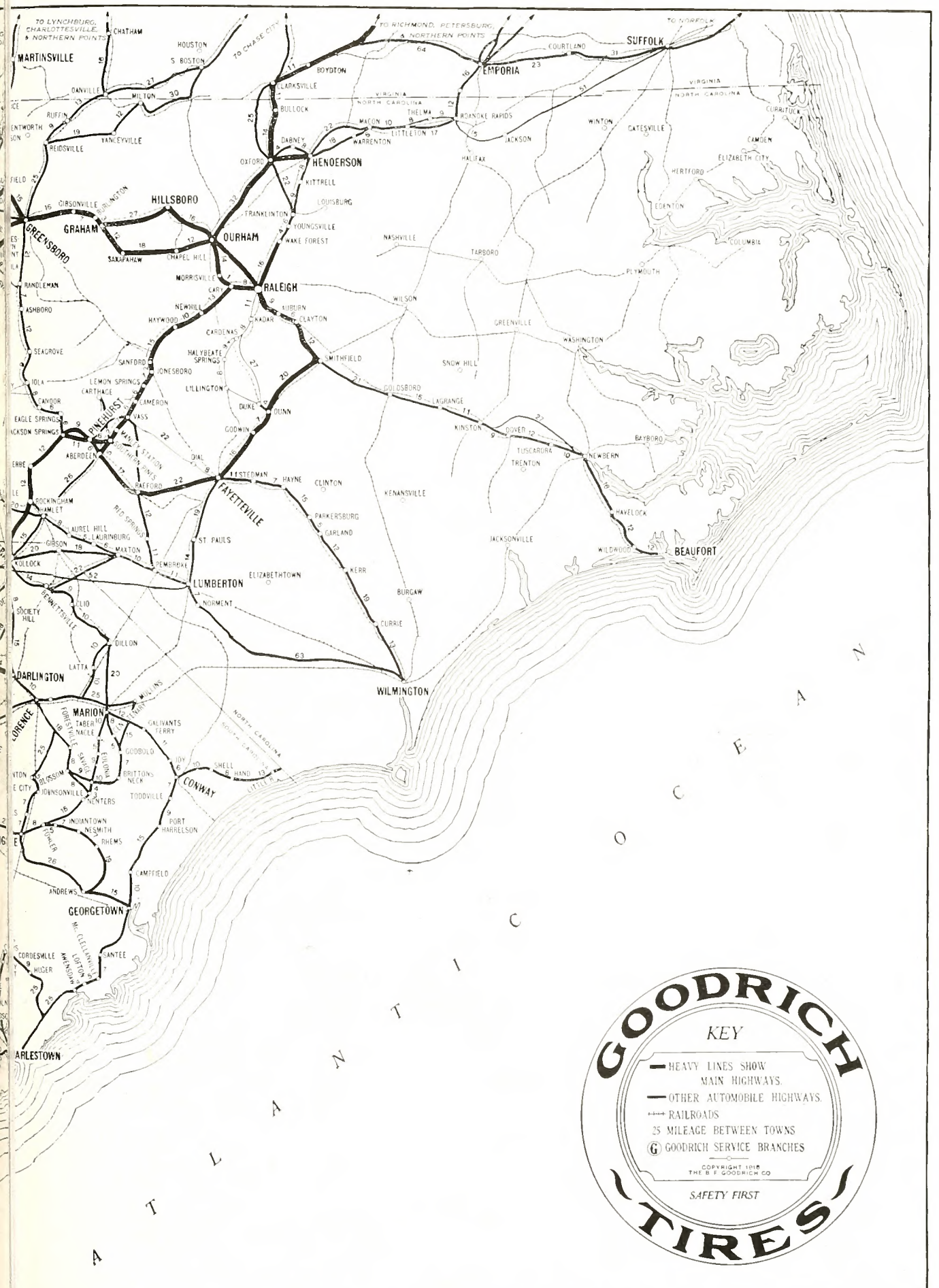
Informal discussion was had of a plan for marking the Jackson Highway. It was suggested that a white band be put around telephone, telegraph and trolley poles along the road, with the letters "J. H." printed in black on the white bank. The matter was left to the executive committee.

The conference adjourned at 3:40 p. m.



Courtesy of B. F. Goodrich Co.

Mileage Highwa



d South Carolina

SOUTHERN GOOD ROADS
A MONTHLY MAGAZINE
DEVOTED TO HIGHWAY AND STREET IMPROVEMENT

Published Monthly by SOUTHERN GOOD ROADS PUBLISHING CO.
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Official Organ of the South Carolina Good Roads Association
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FINGAL C. BLACK, Secretary, Columbia, S. C.

VOL. XI. SEPTEMBER, 1915. No. 3.

ONE WAY TO DO IT.

In this issue of Southern Good Roads is the story of "How Good Roads Came to Davidson County, North Carolina." It tells one way of getting good roads, a way that has been used in several instances in North Carolina. While it has not the approval of all good roads people, there can be no disputing the fact that it has its good points and might be necessary in some cases.

Soon after the passage of the road law for Davidson county authorizing the issuance of bonds and the building of good roads, and while the big row was on in the camp of the anti-good roads element, a bright paragrapher on the Greensboro Daily News wrote that "some counties are born progressive, some achieve progressiveness and then—there's Davidson county."

Or words to that effect, implying that Davidson had to have progress thrust upon her. Nor is Davidson the only county to have progress thrust upon her by a progressive representative. Madison county, North Carolina, woke up one fine morning to find herself saddled with a bond issue of $300,000 by her progressive representative. A bond issue was made possible in Yancey by the same methods and in Yadkin county, provision was made for a $60,000 bond issue for a road through the county—all without a vote of the people.

In every case that has come under our observation, the legislator who forced progress on his people did it from a sense of duty, because he knew that it was what his people needed and that while his action probably meant political death to him, he was willing to suffer it for the sake of his people. In every case, too, though all are of recent occurrence, we have found that the people are seeing the thing in the right way and the legislator is no longer an object of execration.

FAITH IN THE FUTURE.

The Manufacturers' Record recently devoted several pages to a review of the road and street work now in progress in the South. This journal places the total amount of road and street work now actually under construction at $70,000,000, while other public improvements under way, or so far advanced as to make their completion certain, will swell the total to $200,000,000.

The figures are large but we do not believe that our contemporary has over-shot the mark.

What's the matter with the South? In the language of the college boys we are constrained to shout, "She's all right!"

We have passed through a depressing period in the last twelve months. We have heard the South called a pauper, a one-crop country and pessimists have painted her as a broken and dispirited land, but in spite of it all the old South looks pretty good to us. A pauper land, a land of paupers, can't do the things the South is doing. It takes a prosperous, happy, optimistic country to pull off the stunts that the South is pulling off these days. It takes faith, and worlds of it, to make possible the expenditure of $260,000,000 for public improvements and a broken, down-and-out country couldn't do it.

The great South goes on, conquering and to conquer, and there's no stopping her. Large as are the expenditures authorized for 1915, they will be out-classed by the appropriations for public improvements in 1916. The South is out of the woods and the future was never so bright.

Announcement of Road Building Bulletin.

Since farmers have become the chief purchasers of automobiles, interest in better roads has increased wonderfully. But as every motorist knows, methods of road maintenance are sadly in need of organization.

The Du Pont Powder Company, realizing the growing need for an exhaustive bulletin written in a plain, popular style covering the location, building and maintenance of roads, announces the publication of comprehensive treatise on this subject for free distribution.

Although the obvious purpose of this publication is to promote the rational use of explosives in road work, the text is much broader in its scope and covers phases of the subject far remote from the use of explosives. The introductory chapter consists of a discussion of the need of permanent roads and highways and their relation to civic and economic progress. Recommendations are given for permanent locations and the width and character of road desirable under different conditions. Detailed advice is given with regard to the removal of stumps and boulders from the right of way.

A chapter on drainage discusses every phase of the subject from the crowning of the surface to the control of large streams. Advice is given with regard to cut and fill work in hard ground and in rock for both straight and side hill cuts.

The chapter on road building equipment includes everything from the smallest drag scraper to rock crushers and steam shovels.

Special attention is given to the use of different classes of road surfacing material, and advice is given on the construction of earth, shell, sand clay, macadam, brick and concrete roads. This is followed by a chapter on the upkeep of country roads and byatreatise on explosives and their handling and use.

The book is fully illustrated with photographic views and special plan and sectional drawings of roads. It may be obtained free on request by anyone interested in the subject.

Pan-American Road Congress Sept. 13-17.

Arrangements for the Pan-American Road Congress are approaching completion. The congress will assemble at Municipal Auditorium, Oakland, Cal., Monday morning, September 13, and continue five days, closing Friday afternoon, September 17.

The congress is to be held under the auspices of the American Road Builders' Association and the American Highway Association, acting jointly. In previous years these great organizations, which are national in scope, have held separate annual conventions. They will be aided on the Pacific Slope by the Tri-State Good Roads Association, and the Pacific Highway Association. The membership of these two western organizations covers the states of California, Oregon, and Washington.

Invitations to attend the congress and to appoint delegates have been sent to the governors of the states, the executive officials of the Canadian Provinces, and the presidents of the Central and South American countries. Similar invitations have been sent to mayors of cities, and special and general invitations extended to highway officials of states, counties and cities, and to many others interested in road and street construction, maintenance and administration. Sufficient responses have already been received announcing acceptances and delegates appointed to insure a very large attendance.

The program has been given very careful attention. Practically every subject relating to materials and methods of road construction, maintenance, financing, engineering and education has been accorded a place, and will be discussed by the ablest men in the country in their respective branches.

There will be two sessions of the congress each of the five days. The opening session Monday morning will be devoted to the usual complimentary felicitations. Monday afternoon will be given to educational addresses. The sessions of Tuesday, Wednesday, Thursday and Friday forenoon will be taken up with the presentation of papers on the various subjects, and their discussion. Friday afternoon the adjustment of the business of the congress, the reports of committees, and the adoption of resolutions will complete the work.

The Executive Committee in charge of the congress is as follows: Governor Charles W. Gates of Vermont, chairman; Major W. W. Crosby, Munsey Building, Baltimore, Md., program; Mr. James H. MacDonald, New Haven, Conn., finance; Mr. J. E. Pennybacker, Willard Building, Washington, D. C., arrangements; Mr. E. L. Powers, 150 Nassau street, New York, publicity. A considerable number of local representatives have been and are being appointed in different sections of the country who will furnish information in detail.

Among those who have accepted places on the program are the following:

S. E. Bradt, secretary, Illinois Highway Commission.

H. E. Breed, First Depnty, State Highway Commission, N. Y.

Lamar Cobb, State Engineer, Arizona.

G. P. Coleman, State Highway Commissioner, Virginia.

W. H. Connell, chief, Highway Bureau, Philadelphia.

Geo. W. Cooley, State Highway Engineer, Minnesota.

A. W. Dean, Chief Engineer, Massachusetts Highway Commission.

Henry Welles Durham, formerly Highway Engineer Bor. of Manhattan.

A. B. Fletcher, State Highway Engineer, California.

W. S. Gearhart, State Highway Engineer, Kansas.

S. D. Gilbert, Auditor, State Highway Commission, N. Y.

Henry S. Graves, chief, U. S. Bureau of Forestry.

Fairfax Harrison, President A. H. A., Washington, D. C.

Curtis Hill, City Engineer, Kansas City, Mo.

Prevost Hubbard, U. S. Department of Agriculture.

A. N. Johnson, Bureau of Municipal Research, New York City.

H. J. Knelling, County Highway Commissioner, Milwaukee, Wis.

N. P. Lewis, Chief Engineer, Board of Estimate and App't., N. Y. C.

James H. MacDonald, formerly Highway Commissioner of Conn.

T. H. MacDonald, State Highway Engineer, Iowa.

W. A. McLean, Chief Engineer, Ontario Highway Commission.

E. R. Morgan, State Road Engineer, Utah.

M. M. O'Shaughnessy, city engineer, San Francisco.

L. W. Page, Director U. S. Office of Public Roads.

Dr. J. H. Pratt, State Geologist, North Carolina.

George A. Quinlan, Highway Superintendent, Cook county, Ill.

Clifford Richardson, Consulting Engineer, New York City.

F. F. Rogers, State Highway Commissioner, Michigan.

William R. Roy, State Highway Commissioner, Washington State.

Paul D. Sargent, chief engineer, Maine Highway Commission.

Prof. L. S. Smith, University of Wisconsin.

W. D. Sohier, Chairman Massachusetts Highway Commission.

Col. E. A. Stevens, State Commissioner of Public Roads, New Jersey.

George W. Tillson, president A. R. B. A., Borough of Brooklyn, N. Y.

W. D. Uhler, Chief Engineer, Pennsylvania Highway Department.

A. D. Williams, Chief Road Engineer, West Virginia.

J. F. Witt, County Engineer, Dallas, Texas.

Prevost Hubbard has recently accepted the position of Chief of the Division of Road Material Tests and Research in the U. S. Office of Public Roads and Rural Engineering, and has resigned as chemical engineer in charge of the division of Roads and Pavements of the Institute of Industrial Research.

Lee county, Fla., votes September 10 on $350,000 bonds for road construction.

Statistics Regarding Road Work in North Carolina 1914

By JOSEPH HYDE PRATT

THERE is given below a summary of statistics relating to roads that have been collected by the North Carolina Geological and Economic Survey in co-operation with the United States Office of Public Roads. In collecting these statistics a set of questions was sent to the chairman of all commissions having supervision of road work in any part of North Carolina. While complete returns from all sections of the state were not obtained, yet a sufficiently large proportion of commissioners responded to enable these statistics to be prepared.

There was a decided increase in road construction throughout the state during 1914, and the funds available for work during the year 1915 indicate that there will be a considerable increase in the mileage of roads constructed as compared with the previous year.

Road Funds—Bond Issues.

The total amount of bonds issued by counties and townships in North Carolina to January 1, 1915	$ 8,376,300
Amount voted during 1914	777,000
Estimated amount of bonds voted during 1913; sold and used during 1914	2,000,000
Estimated amount of bonds voted during 1914	500,000
Estimated amount of bonds voted during 1913, and 1914, to be used during 1915	1,500,000
Bonds voted since January 1, 1915, which will probably be used during 1915	865,000

Special Tax.

Estimated amount of special tax raised for road purposes in counties and townships during 1914	1,800,000
Estimated amount of special tax used for interest and sinking fund on bond issues	600,000
Portion of special tax money used in road construction and maintenance	1,200,000
Portion of above amount used for construction (est.)	500,000
Portion used for maintenance or repair purposes (est.)	700,000

Free Labor.

Estimated value of labor tax, rating each day's labor at one dollar used for road repir	800,000

Convict Labor.

Approximate number of short term convicts used by counties and townships	1,700
Number of state convicts used in public road work—average	140

Road Mileage.

Number of miles of public road in North Carolina	49,802
Number of miles of surfaced road in North Carolina	6,166
Number of miles of graded road, but not surfaced	3,937
Total number of miles of improved road (graded and surfaced)	10,121
Number of miles of macadam road in North Carolina	1,222
Number of miles of macadam road built during 1914	37
Number of miles of sand-clay or topsoil road in the state	4,206
Number of miles of sand-clay or topsoil road in the state built during 1914	1,270
Number of miles of gravel road in the state	700
Number of miles of gravel road in the state built during 1914	188
Number of miles of specially surfaced road (asphalt, bituminous macadam, etc.)	38
Number of miles of road graded during 1914	1,058
Number of miles of road surfaced during '14	1,495
Total number of miles of road improved during 1914	2,553
Number of miles of unimproved dirt road in the state	39,671

Money Spent on Roads During 1914.

Special tax	$ 1,500,000
Bond issues—$4,865,000 of which about one-half was expended	2,430,000
Value of convict labor (1,800)	360,000
Value of free labor	800,000
Private subscriptions	100,000
Total	$5,190,000

Money Expected to Be Available For Building Roads During 1915.

Special tax	$ 2,000,000
Bond issues	3,000,000
Value of convict labor (about 2,000 men)	400,000
Value of free labor	800,000
Private subscriptions	50,000
Total	$6,250,000

Mr. D. H. Winslow, Engineer U. S. Office of Public Roads, Sends Southern Good Roads This Picture, With the Statement That It Is the Youngest Road Gang in the United States. The "boss" Who Stands in Front, is 18 Months Old. Mr. Winslow Believes in Beginning With the Child in Teaching Road Improvement

America, The Fairyland for Tourists

By ROY D. CHAPIN
President Hudson Motor Car Co.

FROM the time that the motor car took its place in the commercial, social and pleasure life of our citizens, there has annually been expended in touring, by motor, in Great Britain and on the continent of Europe, a sum annually increasing, until, we are informed, it has reached the proportions of $200,000.

These Americans, who annually embark on their pilgrimages to the shrine of Europe must now, for a few years at least, forego these tours because of the reconstruction period that must follow this great war. The recovery from the physical damages caused must be slow and unhampered by the casual sight seeing tourist. Roads, long the pride of France, Belgium, Germany and the Lowlands because of the excessive use made of them in the quick haulage of heavy artillery, cavalry and the heavily loaded tractors and motor trucks, must be reconstructed.

Where, but in this country, does there exist a lake region like unto those of Central New York, Michigan or Wisconsin? The Trossochs of Scotland, beautiful as they are, are dull, and limited as to area, in comparison. Where days are required to see the natural beauties of the Scotch lochs, weeks—enjoyable weeks—weeks filled with surprises, may be spent in any one of the three lake regions named.

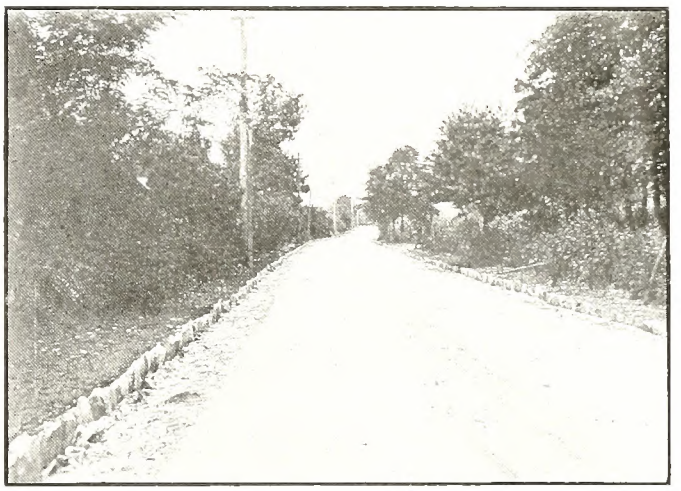
Not even the Alps can give such mountain scenery as the Rockies, the Sierras or the Cascades. Where in all Europe are such natural wonders as are to be found in Yellowstone or Yosemite parks or the Grand Canyon of Arizona? Such natural grottoes as Luray in Virginia and Mammoth Cave are unknown anywhere in Europe. Surely the hallowed fields of Gettysburg and Antietam must thrill the soul and stir the emotions deeper than Waterloo or Liege. What greater honor than a visit to the scene of General Custer's stand on the Little Big Horn? Surely the scenes made famous by a Fremont, a Crockett, a Houston, must pull against those of a Napoleon or a Bismarck. The one possesses no more historic interest nor deeper significance than the other. They all marked epochs in civilization's advance.

The roads? While we have been envying England, France, Germany and Italy their wonderful arteries of highway travel, the improvement at home has gone on apace. Many agencies have been at work. States and counties throughout the length and breadth of the land have awakened from the sleep of apathy, and are doing in true American spirit, each its part—wonderful work of improvement and, in many instances, permanent as to character. By permanent is meant roads of concrete with brick surface. It is gratifying to observe the miles upon miles of roads of this character which have been built during the past four or five years, and to note that during 1914 hundreds of miles of such are being built. The mileage during 1915 will be equal to the total of four preceding years. Nowhere else in the world will the tourist find a road, continuous and connected, of a length equaling our own Lincoln highway. No road or series of roads present such varied scenery or possess such true historical interest. Between New York on the Atlantic seaboard and San Francisco on the Golden Gate, there opens a vista of hill, dale, plain and mountain. Why go to Africa for the experience of a desert tour when it can be made in safety and less hazard in Utah?

A number of routes along the thousands of miles between the East and the West offer themselves for the selection of the tourist, whether his tour be leisurely or hurried. If time is an element and he be hurried, the trip from New York to San Francisco can be made in 20 days but, with little regard for the scenes and pleasure en route. Such a trip would naturally be over the Lincoln highway which, today, is considered the main artery of local and long distance travel by highway.

These and countless other wonder of man and nature await the eye of the tourist who has not, but should, "See America First."

There is no time more opportune than that following the disaster of the present European war. The disappointment that may follow an enforced "tarry at home awhile" will soon be forgotten in the greater



On the Asheville-Weaverville Highway, in Buncombe County, North Carolina

enjoyment of a series of long or short distance tours over American roads and to points of interest within our own boundaries. Why not a trip to your "home town?" It may be in Iowa, Kentucky or California. Have you watched its growth? Would you recognize those scenes to which your memory revert, when cares of business bear down hard or you feel like getting back to nature. Taking you out of the country has not taken the country out of you.

Go where you will, be it north, south, east or west, there await you improved health, much pleasure and a broadened view.

Memphis, Tenn., plans paving estimated to cost $12,229.

Memphis, Tenn., will pave portion of street with wood block; estimated cost $30,000.

Louisville, Ky., will pave six blocks with asphalt; estimated cost $28,500.

Jefferson county, Ark., will construct 4½ miles of macadam road costing $26,000.

Kingstree, S. C., will construct about 70 square yards paving; cost $600.

Lee county, Ga., will construct 15 miles of road.

GOOD ROADS NOTES GATHERED HERE and THERE

Alabama.

The Alabama Good Roads Association has accepted the invitation of the people of Birmingham, the Jefferson County Good Roads Association and the Birmingham Chamber of Commerce to hold the 19th annual session in that city on October 12th and 13th. The meeting will be held during the state fair when low rates and many attractions will be offered to induce a large attendance.

An effort will be made to secure some of the most distinguished good roads advocates in the United States and those interested in national highways to attend the convention. It is expected that a most interesting program will be carried out.

The executive officers of the association will commence at once to advertise and promote the convention. There are over fifty county and twenty odd town and district good roads associations in the state. Each association, Chamber of Commerce, Farmers Union and other organizations will be urged to send delegates to the convention. It is expected that the meeting will be largely attended and a great deal of enthusiasm aroused for the cause of good roads.

* * *

Missouri.

"We are operating our first convict road camp," stated Col. Frank Buffum, Highway Commissioner of Missouri, in a letter to the National Committee on Prisons and Prison Labor. "It has been running about three weeks; the men are well pleased and the work satisfactory despite it has been raining nearly every day for over a month."

"The work is being done in Osage county, about 25 miles east of Jefferson City, widening a road on the edge of a rock cliff. Osage county has a very up to date court which joined with our department. I took out of the road fund sufficient money to purchase a set of tents, and one of the County Judges, who is a large government contractor on river improvement, loaned us his quarry tools.

"The camp is on the Maries River where there is fine fishing, so we bought a complete fishing outfit for each man. There is a library of the latest books enough of them for each man; also the latest magazines and local and city papers are sent to the camp. The men are furnished with pencil, writing paper and envelopes and we have a victrola, a mandolin, indoor games and a base ball outfit.

"Guards are employed at this camp, not because we anticipated trouble, but a few years ago they had trouble in establishing a convict camp in Callaway county, just north of Jefferson City, and the farmers simply would not let them come into the county. Therefore, at this first camp, to show that we are looking after the interest of the local people, we felt it advisable to guard the men until we have shown our camp is practical.

"Governor Major gives three days off the sentences, each month, for good conduct, while after their eight hours work for the county, the county pays them for two hours work at the standard wages for which they could hire other people."

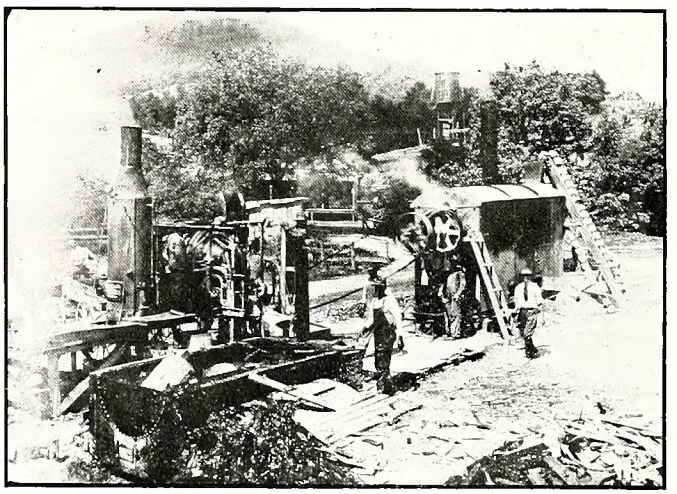
Colonel Buffum has given his personal attention to the diet and has hearty co-operation of the county court in his effort to build up the men through wholesome, nourishing food. The bill-of-fare includes vegetables, cereals, eggs, fresh meat, milk, butter and sugar—all of good quality and well cooked, an unusual thing in a prison.

The success of the road camp is most important in Missouri. It has over 2,600 male convicts in the penitentiary with cell room for 1000, often making it necessary for five and six men to be huddled together in one cell. The prisoners have been worked under the contract system, but owing to the cooperation between the National Committee on Prisons and Prison Labor and the Penitentiary Investigation Committee of the Missouri Senate this worn out system cannot continue much longer and, as Col. Buffum points out, road work can hold out a leading place in the new system of prison industries which must be worked out for the State of Missouri.

* * *

North Carolina.

Mr. N. Buckner writes from Asheville as follows: Through the country seven miles, from Asheville to Weaverville the enterprising commissioners of the county of Buncombe, in Western North Carolina, are building an asphalt-macadam highway sixteen feet wide

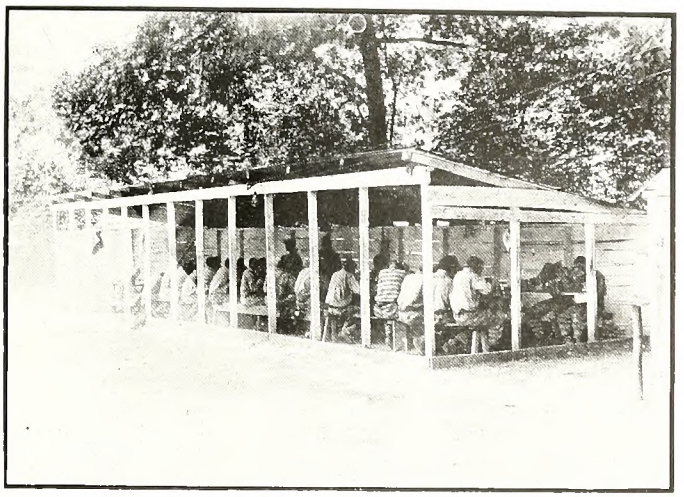


One of Buncombe County's Mixing Plants, on the Asheville-Weaverville Highway

with additional 2-ft. Telford and 3-ft. Telford shoulder borders. It is believed by good road enthusiasts of that section that this road is the beginning of the demand throughout that entire section of roads better than the old macadam and sand clay roads, especially for the main highways across the county and that section of the state.

This road is being built on an old wornout macadam road, except at a few places where the road is being changed to eliminate heavy grades. The old macadam is being scarified and on top of the scarification is being placed four inches of crushed stone and rolled down to two and a half inches. On this foundation, which

is prepared by the county with its convict force, under the supervision of the county road engineer, and county commissioners, a layer of asphalt macadam, the stone ranging from 3.8 inch to 1¼ inches, is put down, 3½ inches loose, and rolled to 2¼ inches thick. In mixing, the stone is heated to about 300 degrees and mixed in a 1-3 yd. mixer, 19 gallons of hot asphalt to one cubic yard of stone. A seal coat is placed on top of the 2¼ inch layer, 3.4 gallon to the square yard, sprinkled



Road Builders at Dinner on the Asheville-Weaverville Highway, Buncombe County, N. C.

with chipped stone and again rolled. The asphalt-macadam coat is being put on by the Crinkly Construction Co. of Harriman, Tenn., for 72 cents a yard. The foundation furnished by the county is costing about 20 cents a yard, or $1500 per mile. The asphalt-macadam roadway is 16 feet wide; the Telford or riprap border 2 feet wide flat, three feet wide with shoulder. B. H. Burrell, senior Highway Engineer of the U. S. Public Roads office, Washington, D. C., has been on the job for about two months giving advice to the county authorities and county road engineer.

* * *

Texas.

The annual midsummer convention of the Texas Good Roads Association was held at College Station, Tex., jointly with the convention of the State County Judges and Commissioners Association August 5, 6 and 7, all the sessions being held at Agricultural and Mechanical College.

The most important feature was the adoption of resolutions to urge the enactment of a bill for the creation of a State Highway Department and the appointment of a State Highway Engineer. The use of convict labor on roads was also discussed.

Dean D. W. Spence of the School of Engineering of A. & M. presided at the opening session. Dr. W. B. Bizzell, president of A. & M., spoke on the importance of good roads from a social and moral standpoint. County Judge J. T. Maloney of Brazos county urged direct taxation in preference to bond issues for building roads.

County Judge George N. Denton of McLennon county, advocated the employment of a competent highway engineer on all work where considerable money is to be spent. Homer D. Wade, former secretary of the association spoke on "Good Roads From an Economic Standpoint." In the evening, A. M. Boles, division engineer of the Association of American Portland Cement Manufacturers, gave an illustrated lecture on "methods of Good Roads Construction."

President J. W. Warren opened the second day's session. A. N. Johnson of the Bureau of Municipal Research, New York City, delivered an able address, explaining its functions. George D. Marshall, attached to the Federal Public Roads Department dwelt on the needs of a State Highdway Department. Discussion on the question "Are Special Road Laws Advisable?" was led by County Judge Beauchamp of Lamar county. Discussion on the use of convict labor was led by County Judge J. M. Tidwell. J. P. Nash of the Bureau of Economic Geology, University of Texas, discussed the various road materials found in Texas. Mrs. March Culmore, state president of the Texas Federation of Women's Clubs spoke on "Why Women Want Good Roads." A number of other speakers addressed the convention.

A plan to carry on systematic road work throughout the state by the organization of sections was adopted before the close of the meeting. The last day was devoted to detail work and entertainment features. The executive committee will decide upon the next meeting place. Officers will be elected at the meeting next February.

Texas Good Roads Convention.

A joint meeting of the county judges and commissioners association, the Texas Good Roads Association, and the Texas Rural Letter Carriers Association was held at the A. & M. College of Texas on August 5 and 6th.

The first session was held Thursday afternoon and consisted of addresses of welcome by Dr. W. B. Dizzell, president of the college, and Hon. J. T. Maloney, county judge of Brazos county, which were responded to by Judge Geo. N. Denton and Mr. John W. Warren, the presidents of the two associations.

Thursday evening was devoted to illustrated lectures and moving pictures showing different methods of road construction.

At the Friday mornig session the subjects discussed were:

1. Should a Highway Engineer or Competent County Road Superintendent be employed by wealthier counties when only the road and bridge fund is to be expended on the roads?
2. Are special Road Laws advisable?
3. County Convict Labor.

Mr. R. J. Windrow, county road engineer of McLennan county opened the afternoon session with a description of the model highway department of that county and its methods of handling construction and maintenance.

Mrs. March Culmore of the Texas Federation of Women's Clubs spoke on "Why women favor good roads," and Mr. James P. Nash, testing engineer of the Bureau of Economic Geology and Technology of the University of Texas, read a paper on "The Economic Road materials of Texas."

The special feature of this session was a discussion of highway legislation, which was led by Mr. A. N. Johnson of the Bureau of Municipal Research, New York City.

The convention closed with an informal dinner and smoker Friday evening.

In connection with the convention there were many exhibits of road materials and machinery, and a demonstration gravel driveway was built with White Motor trucks and an Austin Bros'. grader. No horses were used on any part of this work.

What the A. A. A. Stands For.

What the A. A. A. stands for could not be set forth in more concise langnage than that contained in the report of President John A. Wilson, who, at the reeent annual meeting in Boston, was re-elected as the head of the national organization of owners. Said Mr. Wilson in his annual resume:

"We believe in a logical and comprehensive federal aid to the several states in their roads building; we believe in the freest inter-state use of motor driven and all other kinds of vehicles, as set forth in the Adamson measure; we believe that the owner of an automobile should only be taxed once for its possession, as evidenced by our taking to the United States supreme court the double taxation question; and we believe that it is a function of government for the United States to advertise its scenic and health attractions to its own citizens, encouraging them to become acquainted with their own country, rather than going abroad yearly because of the existence of connected roads systems and atractions which are inferior to what can be found at home. We are an organization of citizens who seek nothing except a general good; and the making clear of this particular point has been no easy task, even though it be absolutely the truth."

Among the resolutions adopted the most important had reference to roads construction, roads travel, and motor vehicle taxation. George C. Diehl, of Buffalo, chairman of the Good Roads Board, presented a resolution which placed the A. A. A. on record and pledged it "to support any measure introduced in the forthcoming congress which shall present a logical plan for national co-operation with the several states, and which plan in our opinion should include the appropriation by congress of an annual sum to be distributed among the several states on the basis of population, area, and mileage; to be supplemented by a like amount of money from the states, and the total to be expended upon whatever main market and post roads the highway department of a state and the secretary of agriculture may decide."

The A. A. A. favors the establishment of a "Federal Bureau of Roads Travel." The department of the interior was complimented for its progressive policy in the following resolution put forward by David G. Joyce, of Chicago, the newly appointed chairman of the A. A. A. Touring Board:

Resolved: That the Hon. Franklin K. Lane, secretary of the department of the interior, and his assistant, the Hon. Stephen T. Mather, be espeeially commended and thanked in behalf of this association for their efforts in connection with the national parks to facilitate their greater use and enjoyment for reereation and health purposes by thousands of Americans, who are more than willing to "See America First" when America is made ready to be seen.

Motor vehicle taxation came in for a quite prolonged discussion, and it was set forth that the automobile had become "a eommon means of transportation, commercially and socially, and enters into every progressive phase of human existence, and it should no longer be considered as a special means of travel." A uniform plan of taxation, which should not be of a double character was called for by the A. A. A. legislative board the new chairman of which is Richard H. Lee, president of the Ohio State Automobile Association, who had much to do with the defeat of double taxation in that state:

Resolved: That the American Automobile Association, through its national legislative board, contend in the several states and in the congress and eourts of the United States, for a uniform method of taxation which shall reeognize the fact that an automobile should now be included in a general property classification and taxed only as personal property, and that no other tax whatever shall be imposed, either in connection with the vehicle or its operation, exeept a nominal registration fee covering only the clerical cost of the issuing of an identifications number for the vehicle and its operator, in order that the police powers of the states or municipalities may not be impaired.

The list of vice presidents selected is as follows: First Vice President, Dr. H. M. Rowe, Maryland; 2nd vice president, Ralph W. Smith, Colorado; 3rd viee president, P. J. Walker, California; 4th vice president, H. J. Clark, Minnesota; 5th vice president, Preston Belvin, Virginia. John N. Brooks of Connecticut continues as secretary, H. A. Bonnell of New Jersey as treasurer, and A. G. Batchelder as chairman of the executive board, on which every state is represented. Both Chairman George C. Diehl of the Good Roads Board and Riehard Kennerdell of the contest board were reappointed by President Wilson.

The annual meeting in 1916 will take place in Washington, D. C., and may be accompanied by a quite extensive scenic tour.

Sumter county, Fla., has voted $250,000 bonds to construct roads.

Victoria, Tex., will issue $30,000 bonds for street improvements, etc.

GOOD ROADS NOTES IN BRIEF

Cloverdale, Ala., has voted $30,000 bonds to improve streets, etc.

Hinds county, Miss., Second District, voted $15,000 bonds to construct roads.

Port Lavaca, Tex., has voted $17,000 bonds to improve streets.

Claiborne county receives bids until September 2 for grading 28 miles of road and for macadamizing 30 miles.

Dickson county, Tenn., voted $250,000 bonds for road construction.

Allen parish, La., Ward 4, voted $150,000 bonds for road construction.

Surry county, N. C., Shoals township, voted $30,000 bonds for road construction; Westfield township voted $30,000 also.

Harnett county, N. C., has voted $25,000 bonds for road construction.

Creek county, Okla., Tiger township, voted $75,000 bonds for road construction.

South Boston, Va., has voted $25,000 bonds for street improvements.

Grainger county, Tenn., votes September 9 on $200,000 bonds for road construction.

Surry county, N. C., Marsh township, votes September 15 on $25,000 bonds for road construction.

McIntosh county, Okla., voted August 20 on $25,000 bonds for road construction.

Macon county, N. C., Ellajay township, votes September 11 on road bonds.

Clay county, Mo., will vote on $150,000 bonds for road construction.

Liberty county, Tex., Cleveland precinct, votes September 22 on $200,000 bonds for road construction.

Baltimore, Md., has awarded $22,900 contract for street paving and $14,280 contract for concrete road.

Chattanooga, Tenn., has awarded $52,000 contract and $6800 contract for wood block paving.

Dallas, Tex., has awarded $35,000 contract for paving.

Havre de Grace, Md., has awarded $5000 contract for street paving.

Jefferson county, Mo., awarded $10,240 contract for road reconstruction and improvement.

Larengo county, Ala., has awarded contract for constructing 40 miles of road.

Louisville, Ky., has awarded $28,500 contract for asphalt paving.

Dyersburg, Tenn., has contracted for 25,000 square yards of asphalt concrete paving.

Kansas City, Mo., has awarded $6200 contract for asphalt paving.

St. Joseph, Mo., has let $67,500 contract for asphalt paving.

Southern Pines, N. C., has awarded contract for 2500 square yards of sidewalks with Portland cement top and crushed granite base.

Williamsburg, Ky., has let $42,000 contract for constructing 18 miles of road.

Winchester, Ky., has awarded $32,000 contract for asphalt paving.

Winchester, Ky., has contracted for 13,000 square yards of asphalt paving.

Birmingham, Ala., will invite bids on paving estimated to cost $50,000.

Cabell county, W. Va., awarded $144,000 contract

for constructing nine-mile road and $80,000 contract for five-mile road.

Oberlin, La., will construct four miles of sidewalks.

Dallas, Tex., plans vitrolithic paving to cost $16,000.

Northampton county, N. C., will construct from 8 to 10 miles of roads.

Lampasas, Tex., will construct eight miles of sidewalks.

Tangipahoa parish, La., has awarded contract to construct 19 miles of dirt roads.

Swain county, N. C., has awarded contract to construct 11 miles of road.

Corpus Christi, Tex., has awarded contract for 88,000 square yards of bitulithic pavement; cost $257,000.

Ohio county, Ky., has awarded contract to construct 3¼ miles of macadam road; cost about $20,000.

Cabell county, W. Va., has awarded contracts to grade five or six miles of road; cost about $15,000.

Chatham county, Ga., votes September 21 on $375,000 bonds for road construction.

Sumter, S. C., votes September 7 on $225,000 bonds to improve streets.

Leon county, Fla., will vote on $200,000 bonds for road construction.

Tuscaloosa county, Ala., has awarded $17,564.12 contract to construct 4½ miles of state-aid road.

District of Columbia Commissioners awarded contract for 7700 square yards of granite block paving.

Westminster, Md., has awarded $11,695 contract for 1.46 miles of state-aid highway.

Benton, Ark., will grade 30 blocks of streets; cost $2000.

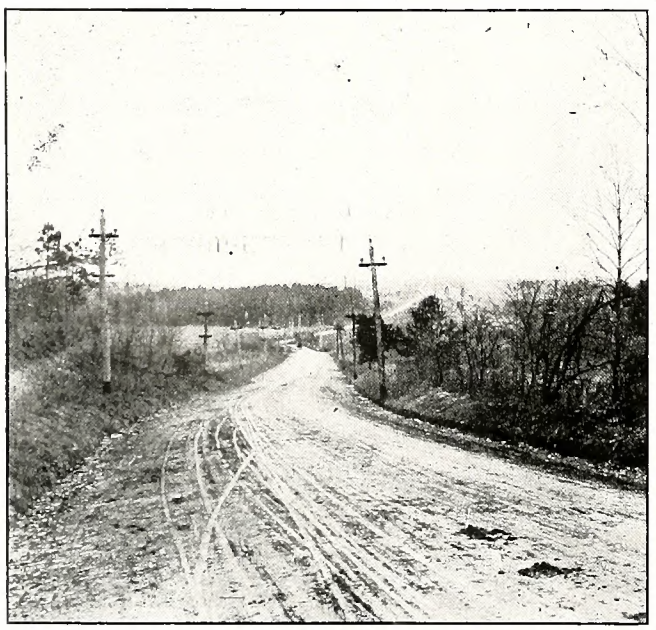
Carroll county, Ky., has voted $50,000 bonds to construct roads.

Chattanooga, Tenn., will issue $80,000 bonds for street paving.

Lowndes county, Miss., voted $50,000 bonds to construct roads in Fourth Supervisors' District.

San Patricio county, Tex., Ingleside Road District No. 3, voted $75,000 bonds to construct about 20 miles of roads.

Livingston, Tex., has voted $17,000 bonds to improve streets, etc.



Macadam Road Near Atlanta, Georgia. Roswell Road 3¾ Miles Out, Looking North

SOUTHERN GOOD ROADS

Published Monthly
By Southern Good Roads Publishing Co.

Lexington, N. C., October, 1915

Entered at Lexington Post Office as second class matter

Southern Appalachian Good Roads Association at Bluefield

Road maintenance will occupy the attention of the Southern Appalachian Good Roads Association in its seventh annual convention at Bluefield, W. Va., October 14, 15 and 16. The program this year is the most comprehensive ever outlined for this big gathering of experts and enthusiasts. The meeting will open Thursday morning, October 14, with the meeting of the executive committee and its sessions will be held in the Masonic Temple. Most of the governors of the eight Southern Appalachian states are expected to be present and speak for their several commonwealths. The past sessions have been devoted chiefly to the promotion of a system of good roads throughout the Appalachian country, but now with the realization of many hopes the time has come to consider keeping these roads in first class condition.

The complete program is below given.

Thursday, October 14, 1915—9 A. M.

Meeting of Executive Committee.
Registration of Delegates with Convention Secretary at Commercial Hotel and Masonic Temple.

Morning Session—10 A. M.

1. Convention called to order by President, Joseph Hyde Pratt.
2. Opening Prayer—Dr. Edward E. Wiley of the Bland Street M. E. Church South.
3. Addresses of Welcome (5 minutes each).
   For Bluefield—Mayor of Bluefield.
   For Board of Trade.
   For West Virginia—Governor Henry D. Hatfield.
4. Responses (5 minutes each):
   For the Association—Joseph Hyde Pratt, president
   For Maryland—Governor Phillips L. Goldsborough.
   For Virginia—Governor Henry C. Stuart.
   For Kentucky—Governor James B. McCreary.
   For North Carolina—Honorable John H. Small, Congressman from North Carolina.
   For Tennessee—Governor Thomas C. Rye.
   For South Carolina—
   For Georgia—Mr. S. W. McCallie, State Geologist.
   For Alabama—
5. Reports of Officers and appointment of Committees.
   President.—Membership Committee.
   Secretary.—Resolutions Committee.
   Treasurer.—Publicity Committee.
   Finance Committee.
   Committee on Nominations and next meeting place.

Thursday Afternoon Session—2:30 P. M.

6. Progress of Road Work by States (10 minutes each):
   Maryland—Mr. Henry G. Shirley, State Road Engineer.
   Virginia—C. B. Scott, Secretary of State Highway Commission.
   West Virginia—A. D. Williams, State Road Engineer.
   North Carolina—W. S. Fallis, State Road Engineer.
   Tennessee—W. E. Myer, president of Tennessee Highway Association.
   South Carolina—William G. Sirrine.
   Georgia—S. W. McCallie, State Geologist.
   Alabama—W. S. Keller, State Road Engineer.
   Kentucky—Robert C. Terrell, Commissioner of Public Roads.
7. County Reports (5 minutes each).
   Given by delegates of counties represented.

Night Session—7:30 P. M.

8. Illustrated Lecture on Road Maintenance by Mr. M. O. Eldridge, Acting Director of the U. S. Office of Public Roads and Rural Engineering.

FRIDAY, OCTOBER 15, 1915.

Morning Session—9:30 A. M.

9. Opening Prayer—Rev. Harry S. Mabie of the First Baptist Church.
10. Road Maintenance.
    Leading paper by Honorable Henry G. Shirley, State Road Engineer of Maryland.
    Discussion—Lead by Robert C. Terrell, Commissioner of Public Roads of Kentucky.
11. Road Building, Maintenance and Tourist Travel, Henry R. Brown, of Tennessee.
12. Road Classifications and Distribution of Funds, Blake Taylor, formerly District Engineer of Wetzel County, West Virginia.
13. Address—Honorable A. A. Lilly, Attorney General of West Virginia.

Twelve O'Clock.

Luncheon at Country Club.

Afternoon Session—2:30 P. M.

14. Concrete Roads in Wood County, West Virginia, Mr. Burdette Woodyard, County Engineer of Wood County, West Virginia.
15. Railroads and Good Roads, Honorable M. V. Richards of the Southern Railway.
16. Results of State Prison Labor in Kanawha county, West Virginia—Philip Joseph Walsh, Road Engineer of Kanawha County.

Four O'Clock.

17. Visit to Coal Mines and Electrification System of the Norfolk & Western Railroad.

Night Session—7:30 P. M.

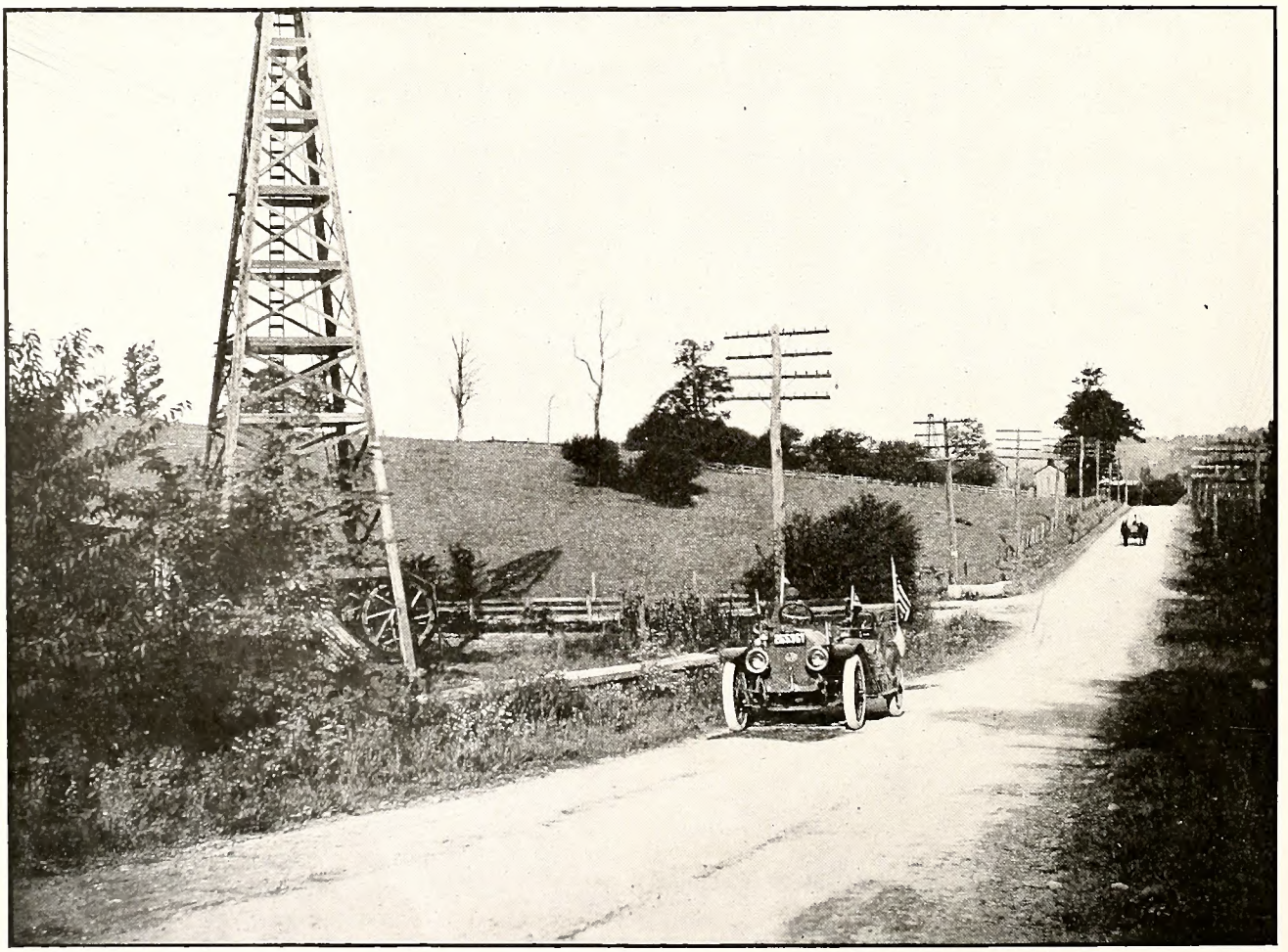
18. Importance of Uniform Plans and Specifications, A. D. Williams, Road Engineer, West Virginia.
19. Roads which make Life worth Living, A. G. Batchelder of the American Automobile Association.

SATURDAY, OCTOBER 16, 1915.

Morning Session—9:30 A. M.

20. Opening Prayer—Rev. Samuel W. Moore, of the First Presbyterian Church.
21. Progress Reports from Representatives of Good Roads Associations:

Maryland Good Roads Association—Major John I. Yellott, president.
West Virginia Good Roads Association—W. A. MacCorkle, president.
Alabama Good Roads Association—John Craft, president.
North Carolina Good Roads Association—H. B. Varner, president.
South Carolina Good Roads Association—F. H. Hyatt, president.
Tennessee Highway Association—W. E. Myer, president.
Kentucky Good Roads Association—R. J. Mc-McBride, president.
Virginia Road Builders Association—C. B. Scott, president.
Georgia Federation of Road Authorities—William F. Eve, president.
East Tennessee Good Roads Association—Henry R. Brown, president.
Southeastern Kentucky Good Roads Association—N. R. Patterson, president.
North Georgia Good Roads Association—A. N. Tumlin, president.
East Carolina Good Roads Association—H. H. Husbands, president.
Appalachian Park Association—George S. Powell, secretary.
The Dixie Highway Association, M. M. Allison, president.
Knoxville-Chattanooga Highway Association—T. H. Thompson, president.
Southern West Virginia Good Roads Association—W. J. McClaren, president.
Central West Virginia Good Roads Association—George Norris, president.
Trans-Alleghany Good Roads Association—George W. Stevend, president.



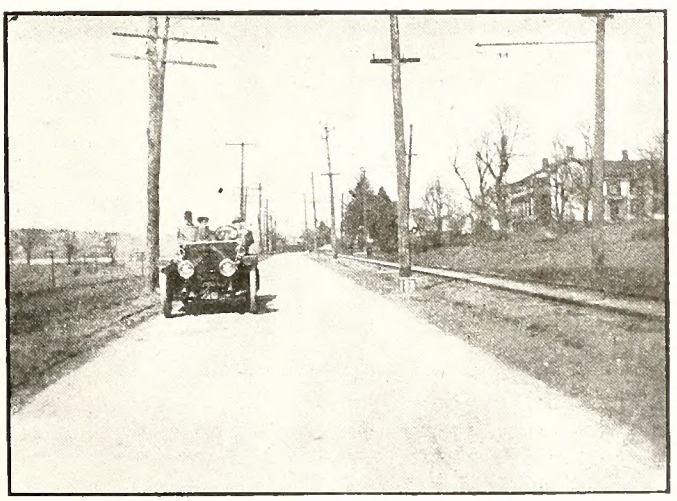
Fine Type of Macadam Road near Wheeling, W. Va.

Booneway Booster Band—James Maret, secretary.
Memphis-Bristol Highway Association—J. A. Gowan, president.
Asheville and Buncombe County Good Roads Association—E. C. Chambers, president.
Wise County Good Roads Association—John Chalkley, president.
Kentucky County Good Roads Engineers' Association—Guthrie Wilson, president.

22. Progress reports from Representatives of Special Highways:
    Asheville-Greenville,
    Knoxville-Atlanta,
    Asheville-Murphy-Atlanta,
    Central Highway of North Carolina,
    Knoxville, Cumberland Gap-Cincinnati.
    Hendersonville-Spartanburg,
    Hickory Nut Gap,
    Bristol-Charlotte,
    Memphis-Bristol.
    Bristol-Washington,
    Booneway,
    Bristol-Bluefield-Pittsburgh,
    Crest of the Blue Ridge,
    National Highway,
    The Wilderness Road through Kentucky by Judge T. J. Asher, of Kentucky.
23. Report of Committees and election of Officers.
24. Adjournment.

Virginia Roads Poorly Drained.

..In giving an account of a recent trip over the roads in this section of the Commonwealth of Virginia, Charles B. Richardson, of Richmond, points out in a forcible manner that Virginia's highways are the laughing stock of the people of other states, and all because of the lack of proper drainage. The methods of other states in caring for highways after they have been improved are cited by Mr. Richardson, and he urges that steps be taken to save the dirt and gravel



A Fine Macadam Road Near Parkersburg, West Virginia

roads of Virginia from decay.

"Virginia has a good name in many respects, but she is the laughing stock of the Union when it comes to roads. Richmond, the capital of the state, can be reached only in dry weather, then over horrible roads. We have the sand, clay and gravel. We build a good road and then let it remain forever afterward. There are nearly 20,000 automobiles in Virginia paying a special tax of near $200,000. It is safe to say that fully 10,000 of these cars are owned in this section of Virginia. This sum does not include regular taxes on cars.

"The thought occurs to me, 'Where does the money go?' We have built some good roads from Richmond in the last ten years, but they are all worn out now. The Petersburg pike, for instance. It is a disgrace to any community now.

"In comparison let us look at our neighbor city—Petersburg. From that city one can travel for sixty-five to 100 miles over perfect gravel roads! Why can't Richmond wake up ?

"We have recently completed a new road to the Country Club. Go over it after a rain. Is it completed? Unless you stick to the center you are gone! Why not complete it before the center is ruined?"

County Pride Brings Good Roads.

Mr. A. T. Smith, of Los Angeles, Cal., tells in the Los Angeles Tribune how the automobile tourists of the United States who have been attending the Exposition and touring California in their cars have been the means of bringing good roads to Ventura county. Other counties around them had good highways but Ventura was getting a black eye. Her folks became aroused, and fully aroused, so they are providing a million dollars for a regenerated system of public roads. Mr. Smith tells about the transformation in the following words:

"Ventura county has just voted $1,000,000 for good roads bonds," Mr. Smith said, "and the interest there is keen. Ventura has been behind the other counties along the coast route between Los Angeles and San Francisco, but they have awakened at last and now are going to see things through to the finish. There was more interest in the bond election than is shown customarily on political question.

"To some it seemed that $1,000,000 was a great deal of money to raise all at once. It was pointed out, however, that the value of property is helped greatly by better roads, and the condition in Los Angeles county was cited as an example. It seems that Ventura county suffers every year from destruction of its roads by floods. Advocates of improved roads said the reason was due largely to the fact that the roads were in no shape to withstand the water, and a system of surfacing and proper drainage would be the remedy.

"When touring between Los Angeles and San Francisco it is an easy thing to note when Ventura county is reached because of the difference in roads. The Santa Susana route is a good example. It is boulevard all the way in this county, but when the line is passed in the hills at the summit the rough going begins and continues for many miles. Ventura wants to have this state of affairs changed and although a million dollars may seem a burden to some, there is reason to believe the roads will pay for themselves through the increased travel and additions to the value of adjacent property."

Wyoming county, West Virginia, climbs up on the front end of the band wagon with a good roads' bond issue of $550,000.

De Soto county, Florida, will construct brick and sand asphalt roads at a cost of $350,000.

Suffolk, Va., has voted $75,000 for better roads and streets.

Good Roads Near Bluefield

By GEORGE C. HILL

Chief Engineer Macadam Road Construction Under Mercer County Bond Issue---Former City Engineer of Bluefield, W. Va.

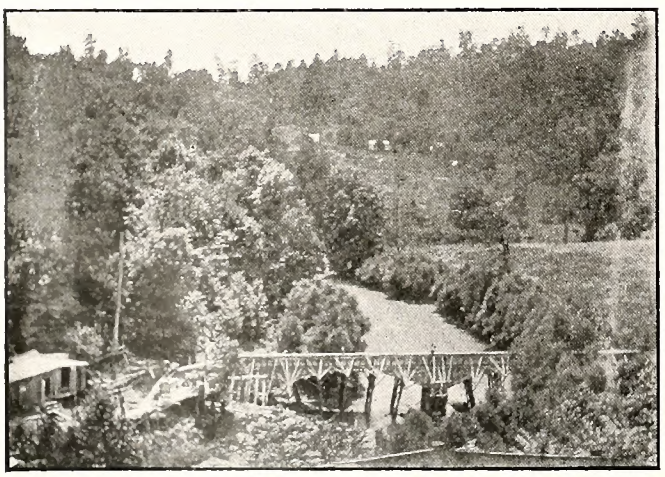
The county roads of Mercer county, West Virginia, are being improved under bond issues of December 15, 1913, and May 15, 1915, the first being for $500,000 the second for $350,000.

When the work is completed Mercer county will have improved roads between all the principal points in the county, as shown by the following table of miles and kind of road:

	Bituminous	Water-Bound	Improved Dirt.
Princeton to Bluefield	8.7		
Princeton to Athens	6.3		
Bluefield to Bramwell	9.0		
Bramwell to Rock		8.0	
Carr school house to Sand Lick		7.3	
Pocahontas to Cooper		2.3	
Bluefield to Abshire Gap		2.0	2.0
Rock to Giatto		6.4	
Coopers X Roads to Flat Top			22.8
Princeton to Glenlyn			15.1
Athens to Lerona			7.9
Giatto to Springton			4.1
Duhring to Goodwell			2.0
Pocahontas to Flat Top Yards			1.6
Montcalm to Mora			4.5
Total miles	24.0	26.0	60.0

The surveys for these roads were made during the summer of 1914 under the charge of W. I. Lee, formerly of the Virginia state highway department. Contracts were let in the fall of 1914 and construction carried on during the winter and spring of the present year.

The writer took charge of the work January 1, 1915, and at the present time practically all of the macadam

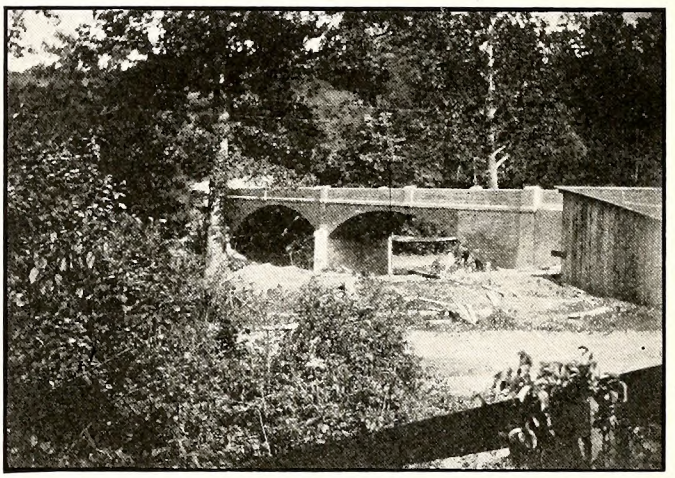


Cut Showing Method of Concrete Bridge Construction Near Bluefield, W. Va.

roads have been graded and also a large part of the improved dirt roads.

Work is progressing on three of the macadam roads and all are under contract to be completed this year, except six miles. All the work is being done under contract at prices considered to be quite low for the class of work .

All streams are crossed by reinforced concrete bridges of slab and girder type, spans up to 40 feet being of this class. There are three reinforced concrete bridges across the Bluestone river, each consisting of two arches of 63 foot span; one of these bridges being shown in an accompanying illustration.



Completed Concrete Bridge in Mercer County, West Virginia

All the macadam roads are built on grades not exceeding 5 per cent, and three of these roads have grades not exceeding 3 per cent. Nearly all the improved dirt roads have grades not exceeding 5 per cent. The grades obtained are considered to be very satisfactory when the irregular topography of Mercer county is known. Several of the roads cross high ridges, especially those crossing the county from east to west.

The engineering work is in three sections in charge of assistant engineers, the division offices being at Princeton, Athens and Bramwell, with central office at Princeton, thec ounty seat.

All the work is under the control of the county court.

$5,865,000 for Florida Roads.

During this year there has been especial activity throughout the state of Florida in providing county bonds for the construction of modern highways, the largest recent issues totaling $5,865,000. This amount includes $800,000 for Palm Beach county, which has sold bonds; Seminole county, $450,000 voted; Pinellas county, $750,000 voted; Orange county, $600,000 voted; Lake county, $500,000 voted; Polk county, $1,000,000 to be voted upon; Lafayette county, $300,000 to be voted upon; Taylor, $500,000 to be voted upon; Hillsborough county, $1,000,000 being expended. The Polk county vote is intended to provide funds for constructing 208 miles of 15 and 9-foot highways.

Grades and Excavations

By A. B. WILLIAMS

State Highway Engineer of West Virginia

IN THE past two or three years stress has been laid on the subject of permanent roads. Many articles have been written bearing upon the various kinds of surfaces, but the ever-important subject of grade and excavation has received only passing notice. Yet the only permanent thing about a road is its grade and location. The various kinds of surface will yield to the actions of the elements and pass the march of time, but the road once established will become more fixed as the years go by, adding improvements and new property lines to bind it firmly in place. This makes more important the engineering subject of our roads. The establishment of grades and location should be given the greatest consideration.

The Minimum Grade.

The principal factor entering into the determination of a minimum grade is the question of sufficient drainage. Except on fills over 2 feet the minimum grade should not be less than three tenths (.3) of 1 per cent and preferably not less than five-tenths (.5) of 1 per cent.

The Maximum Grade.

There are a number of factors that enter into the maximum grade, but, before attempting to locate any road or to establish any grade the engineer should make a thorough study of the territory to be developed by the proposed road giving due consideration to the following points:

First. What will be the present and future demands of the territory adjacent to the proposed improvement;

Second. What are the possible developments in the territory from an industrial, agricultural, educational and social standpoint;

Third. What part will the proposed road be of a general system of roads reaching to other communities and what will be the effect of the improvement on other sections;

Fourth. The nature of traffic that the road will be called upon to take care of, making due allowance for development, considering the present and future tonnage;

Fifth. The general direction in which the greatest amount of tonnage will be transported, the class of tonnage and the time necessary to move it in order to make it the most marketable;

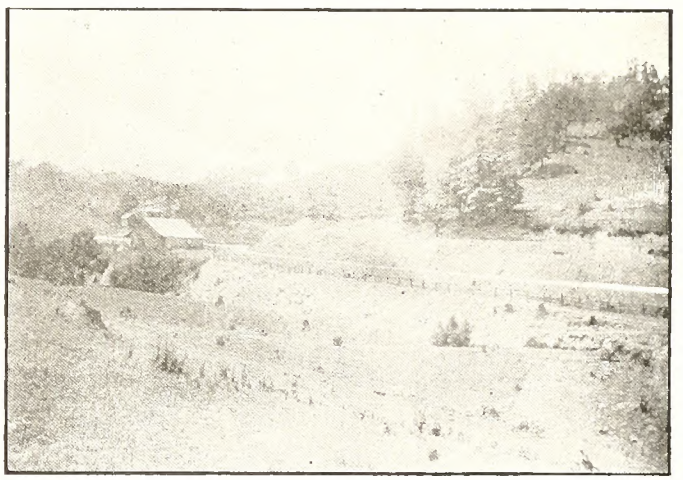
Sixth. The direction in which the ascending grade will be in comparison with the possible traffic demands;

Seventh. The maximum load that a horse can pull based upon the length of grade and the time required to make the trip, from the standpoint of the horse and the time necessary to get the best results for the kind of material the country will produce;

Eighth. Consideration should always be given to climatic conditions and to the season that the roads will be required to take care of the heaviest traffic, as well as a study of the foothold for horsedrawn vehicles. The possible amount of frozen or icy weather should be noted in determining a maximum grade;

Ninth. The class of material over which the road is to be made and the cost of construction on the longer distance compared with the steeper grade and shorter distance have a certain bearing upon the subject, because the most important subject in connection with the cost of roads on grades is that of maintenance which increases very rapidly with the increase of grade. Roughly speaking the destructive effect of violent and periodical storms is four times as great on a 5 per cent as on a level ground, and nine times as severe on a 10 per cent as on level grade. Thus if no other factors were to be considered on earth roads alone the cost of upkeep in a very few years would justify the elimination of bad grades;

Tenth. The condition of the right-of-way and the possible chances for disposition of water and drainage are factors of much importance when considering the maximum grade, because on steeper grades the increasing velocity demands more drainage and greater skill in handling the water, which, if kept on or near the road will soon destroy it.



Showing One of Heaviest Grades on Mountain Roads, Mercer County, W. Va.

Eleventh. The consideration of a grade from the ascension is not the only angle of approach in the location of highway grades because important items enter into the descending grade that should be given as much, if not more, consideration than the ascending direction;

Twelfth. A grade should not be steeper than a horse can descend safely in a trot;

Thirteenth. A grade should not be steeper than a team can safely descend with a load that it can handle for ten hours under normal conditions, exerting its normal tractive force.

Fourteenth. The amount of time necessary to descend a grade should be considered making due allowance for the maximum speed that can safely be used on that grade;

Fifteenth. The highway engineer of today must remember that as time passes the motor traffic requirements of the public highway will be more and more exacting. Experiments as to gasoline consumption and its efficiency on difficult grades and materials are now being conducted near Uniontown, Pennsylvania, by Mr. R. O. Gill, experimental engineer for the Chalmers Motor Company of Detroit, Michigan. In this connection we have but little data. Some recent experiments made by Mr. H. Kerr Thomas and Mr. D. Ferguson of Buffalo, New York, for the Pierce-Arrow Motor

Company, show that the class and kind of surface exert more influence upon the motor-driven truck than the percentage of grade and that it requires practically the same tractive force on a 1 per cent grade in sand and loose stone to handle the same load as it does on a 27 per cent grade on concrete, asphalt, new brick and first-class macadam. But observations of the speaker lead to the conclusion that grades of any length exceeding 5 or 6 per cent are not as satisfactory and as economical as lighter grades for motor traffic owing to the increased hazard, increased consumption of gasoline, and loss of power due to the resistance to gravity. The speaker's observation further concludes that in frozen or icy weather motor traffic is extremely hazardous on grades exceeding 10 per cent. and entirely unsafe on grades exceeding 16 per cent;

Sixteenth. Grades crossing a summit should merge into each other by some form of vertical curve. The speaker has been accustomed to using the following formula which proves satisfactory and practicable. Take the summit grade at "e" and a grade point 100 ft. on each side or any other desirable distance and by use of either one of the following formulas find the elevation at "f" which will be half-way between "e" and "g," then by use of the formula finds the offset from the tangent at each of the ordinates. This subtracted from the elevation of the ordinate will give the true elevation of the grade.

By reference to Gillespie whose work contains about all we have upon tractive power of a horse, which embraces the experiments of Sir John McNeil, Sir Henry Parnell, and Mr. Cayffier, some of whose works are quoted by nearly every writer, we find that a horse traveling at the rate of two and one-half miles per hour can exert 10 per cent of his weight, and travelling at the rate of four miles per hour, can exert 6 per cent of his weight. These observations prior to 1850 and just before the advent of the steam road into our field of engineering embrace about all the experiments we have excepting the work of Mr. E. B. McCormick of Kansas State Agricultural College and the works of Prof. J. H. Waters of the University of Missouri, and other work by Mr. McCormick is now being done for the Office of Public Roads, at Washington. The speaker's personal observations have shown that a horse for a limited period can exert one-fourth and sometimes even greater percentage of his weight, this depending in a measure upon the kind of shoes on the horse and the foothold on the grade. A horse on a road material that offers safe footing can be safely trotted down a 5 per cent grade, but cannot be trotted down this heavy a grade for any great length of time without injury by "jamming or stoving him up." Therefore, the ruling grade should not exceed 5 per cent. if for a horse-drawn vehicle over which speed must be made on the descending grade because the average horse in walking down a grade will not make over four miles per hour, while he will trot twelve miles per hour, thus, from this standpoint, we can double the distance of the road and increase the time 33 1-3 per cent. The speed of twelve miles per hour should not be undertaken down a grade of more than 3 per cent with a vehicle bearing any kind of a load. In ascending a 5 per cent grade the capacity of the team is about four-tenths of its capacity on level ground and about one-fourth of its capacity on 10 per cent grade, on a loading for the same tractive exertion, but a point here that should not be forgotten is that for a short duration a horse can exert from 25 to 40 per cent of his weight, thus doubling and quadrupling its normal tractive and in this connection it is often economy, considering the financial condition of the community to put in a short piece of 6 and even 7 per cent grade, than to expend a large amount of money in making an exhaustive and expensive cut, especially so if the cut must be made at the expense of development in some other part of the community. One thing that should be borne in mind is that each year's development of our country makes the chances for changing of grades and their elimination less possible, and that while the improvement of

Section of Macadam Road Between Bluefield and Princeton, W. Va.

the surface of a road increases its tractive effieiney about 200 per cent on level ground it only increases about one-fourth for a horse-drawn vehicle on a 10 per cent grade, thus money expended in decreasing the grade within a reasonable amount of distance is the best possible investment.

Then with these conclusions drawn and a decision as to the kind of surface that will possibly be placed upon the road at some future time, we are in position to determine what should be the maximum grade.

Methods and Costs of Grading and Excavating.

This is a machine age and wherever grading can be done by machinery it is usually more economieal. The following table based upon figures taken from different pieees of work is approximately correct to a wage scale of 15 cents per hour and capable supervision.

By a glance at the figures it will be seen that at 22 cents per yard or at the same cost for any given ratio cost distances are for wheelbarrow, 200 feet; drag scraper, 400 feet; wheel scrapers, 500 and 600 feet; one horse eart, 1500 feet; wagon, 1800 feet, while tractor and truck on track do not reach the amount within one mile. The cost of grading depends materially upon the class of material, the location and the management of the operation. In McDowell county, West Virginia, a contractor failed on a contract at 65 eents per eubie yard, for a material running about 60 per cent soft sandstone rock, and 40 per cent earth. The county purchased a steam shovel and moved the material at a eost of 19 cents, including explosives, drilling and shooting. This was casting work on heavy hillside grade. Thus the contract price to the county was $13,000 for the 20,000 yards. The cost of the labor and explosives, and upkeep of the machine was $3800. The

GRADES AND EXCAVATIONS.

Picking 5 cts., Plowing 2 cts., Steam plowing 1.5 cts. per cubic yard. Hauling by wagon approximately 35 cts. per cubic yard. Hauling by trucks and tram 14 cts. per cubic yard.

Comparative cost per cubic yard for moving earth with:

Dis-t'ces H'ld	Wheel-barrow	Drag or Slide Scraper	No. 1 Wheel Scraper	No. 2 Wheel Scraper	1 Horse Cart	Wagon	Tractor and Trucks	Grader	Casting Over Bank
Feet									
100	$0.057	$0.090	$0.100	$0.100	$0.056	$0.095	$0.080	$0.022	
200	0.114	0.135	0.130	0.125	0.068	0.103	0.080		
300	0.170	0.180	0.160	0.150	0.080	0.111	0.080		
400	0.230	0.225	0.190	0.175	0.090	0.119	0.080		
500	0.285	0.270	0.220	0.200	0.101	0.127	0.089		
600	0.342	0.315	0.250	0.225	0.112	0.135	0.080		
800	0.457	0.405	0.310	0.275	0.135	0.151	0.080		
1000	0.570	0.495	0.370	0.325	0.160	0.167	0.090		
1500	0.857	0.720	0.520	0.450	0.214	0.207	0.090		
2000	1.143	0.945	0.670	0.575	0.271	0.247	0.100		
3000	1.713	1.395	0.970	0 825	0.388	0.327	0.100		
4000	2.280	1.845	0.270	1.075	0.500	0.407	0.100		
Loading by hand:									
	0.050	0.010	0.010	0.010	0.130	0.130			0.100
Loading by steam shovel:									
					0.060	0.060			0.060

cost of the machine including drill and compressor was $5500, or a total of $9300 including the cost of the machine, leaving the county a profit of $3700 in cash and the equipment.

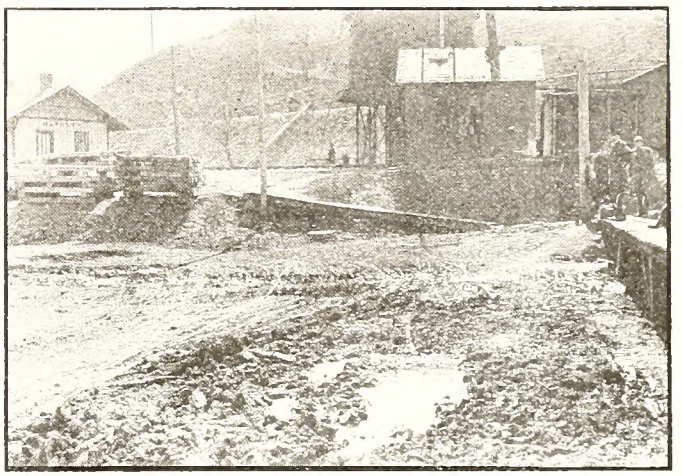
In Marion county, West Virginia, a contractor recently contracted for a piece of work unclassified at 46 eents and the work cost 52 cents, this was done by steam shovel, being about 70 per cent rock and 30 per cent earth.

In Mercer county, West Virginia, Walton and Company have contracted for grading of nine miles of road at 48 cents per cubic yard unclassified which work is running about 7360 cubic yards per mile.

In Pleasants county, West Virginia, material running about 80 per cent rock, and 20 per cent earth cost 83 cent per cubic yard to grade by day labor at 20 cents per hour, teams at $3.50 per day. On the same piece of work with prison labor on the honor system which costs 75 cents per day and teams $3.50 per day, the grading cost 30 cents per cubic yard.

In Kanawha county, West Virginia, the Atlantic Bitulithic Company has a contract for three miles of road grading and surfacing. The grading is contracted at $1.25 for stone and 34 cents for earth classifications running about 70 per cent and 30 per cent earth, or an average of 97.7 cents per yard. The state has a prison camp working on the honor system under a competent engineer and is moving the same class of material at 24 cents per cubic yard.

Then as to methods the writer would suggest the use of machinery wherever possible under competent supervision and under proper direction and to make use of the state and county prison labor. On work that is light and on which machinery can be employed the work should be done by day labor. On heavier work and large quantities the speaker would recommend



This is a Section of the Main Street of Matoaka, W. Va.

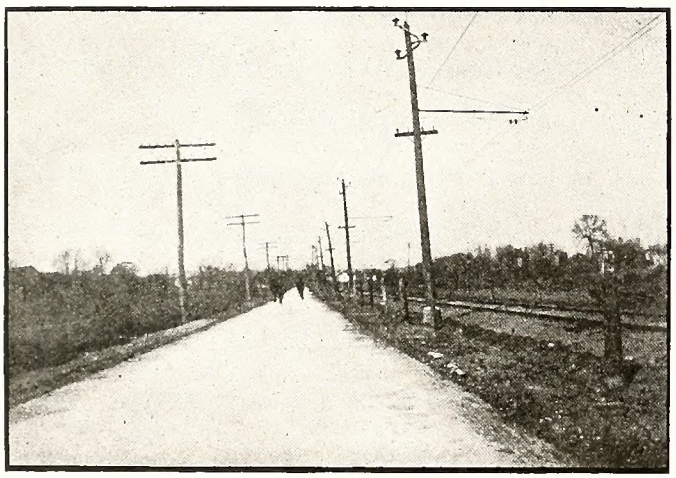
contracting and to the contractor a systematic organization of his work so as to get the most efficient service from his men and equipment. There are volumes written covering the subject of Cost Data in heavier work but the writer's experfience in highway work leads to the conclusion that there are many elements entering into the cost of highway construction that are often overlooked when comparing this class of work with heavier work. One point of deficiency that have been noticeable and should be emphasized here is the lack of organization in highway construction in the various sections of the country. In many instances 50 per cent of the cost could be saved by an adequate organization.

Economical Considerations.

The economieal phases of highways and highway construction are many, and call for more time than the speaker should occupy. We might say that in studying the history of highways and highway economics that it can be divided into three periods: The Roman or Ancient Road, the Telford and MacAdam period, extending from 1750 to about 1840, and our modern or twentieth century awakening. The Roman road with its 3 feet of stone was reduced about one-half in the

days of Telford and MacAdam and now with modern machinery we are constructing macadamized roads in West Virginia at costs ranging from $1000 to $4000 per mile, concrete from $7500 to $12,000 per mile, and brick $9,000 to $20,000 per mile. It should be borne in mind, that the cross section of a road should be so as to permit the greater portion of the work to be done by machinery on ground where machinery can be operated, and that an extra width of the road on hillsides increases the cost. A road on hillsides should not be wider than is needed to care for the traffic. In county districts a 9-foot concrete bituminous or brick or a 10-foot macadam with 5 feet of earth on each berm will meet all the requirements at much less cost.

On ground free from roots and stone, where a road machine can be used the material can be moved at a cost of less than 5 cents per yard, and on hillsides grading where the work is casting a small steam shovel is an economical machine to use. With this should go a drilling outfit and attachments so it can be operated with the same power. Barbour county, West Virginia, this season purchased a tractor and heavy grader for each district, equipped them with drilling outfit and with less money than they expended in 1913 without

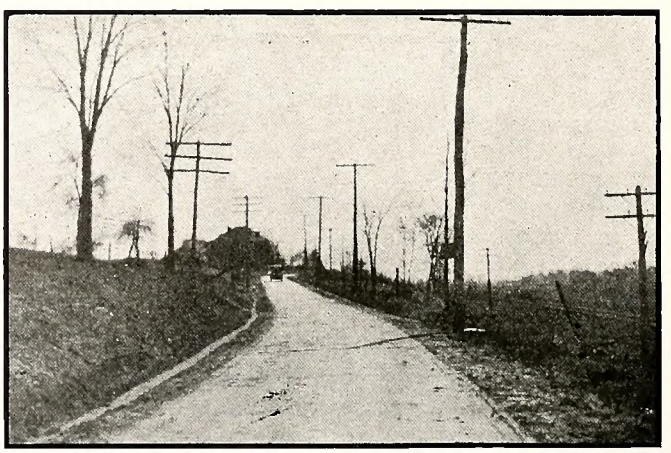


Well Constructed Highway in Parkersburg, District, Near Parkersburg, West Virginia

showing visible improvement upon their roads, have graded nearly all of the roads of the county in good shape.

In conclusion I want to say that the most economical thing a community can do is to improve its roads so as to serve all its demands and to do this, it should employ a competent highway engineer to make a careful study of the needs of the territory, its financial ability to construct and maintain a road and to locate and superintend the construction of their road for them. When the road is constructed a competent patrolman should be placed on it to continually keep up the maintenance and repairs. Many of our paths and by-ways were not located by men or by engineers but were the foot-prints of the primitive mound builders, the buffalo, the deer and the wild animal that wandered to and fro in the wildwood. Thus our roads need revising because

One day through the primeval wood,
A calf walked home, as good calves should;
But made a trail all bent askew,
A crooked trail as all calves do.
Since then two hundred years have fled,
And, I infer the calf is dead.
And from that day o'er hill and glade
Through those old woods a path was made;
And many men wound in and out,
And dodged and turned, and bent about
And uttered words of righteous wrath
Because 'twas such a crooked path.
This forest path became a lane,
That bent, and turned, and turned again;
This crooked lane became a road,
Where many a poor horse with his load
Toiled on beneath the burning sun,
And traveled some three miles in one.
And thus, a century and a half
Trod in the footsteps of that calf.
The years passed on in swiftness fleet,
The road became a village street;
And this, before men were aware,
A city's crowded thoroughfare.
And soon the central street was this
Of a renowned metropolis.
And men two centuries and a half
Trod in the footsteps of that calf.
Each day a hundred thousand rout
Followed the zigzag calf about;
And o'er this crooked journey went
The traffic of a continent.
A hundred thousand men were led
By one calf near three centuries dead.
They followed still his crooked way,
And lost one hundred years a day;
On some roads the first engineer
Was a wild beast or fleeting deer.
Road Builders, be sure when you laugh,
That you're not trailing a calf.
For such a reverence is lent
To well establish precedent,
That men are prone to go it blind
Along the calf paths of the mind,
And work away from sun to sun
To do what other men have done.
They follow in the beaten track,
And out, and in, and forth, and back,
And still their devious course pursue,
To keep the path that others do.
But how the wise old wood gods laugh
Who saw the first primeval calf.
Ah! many things this tale might teach
But I am not ordained to preach.



Macadam Road Near Parkersburg, West Virginia

Alleghany county, Pa., has let contracts for four roads to be built at a cost of a over $175,000.

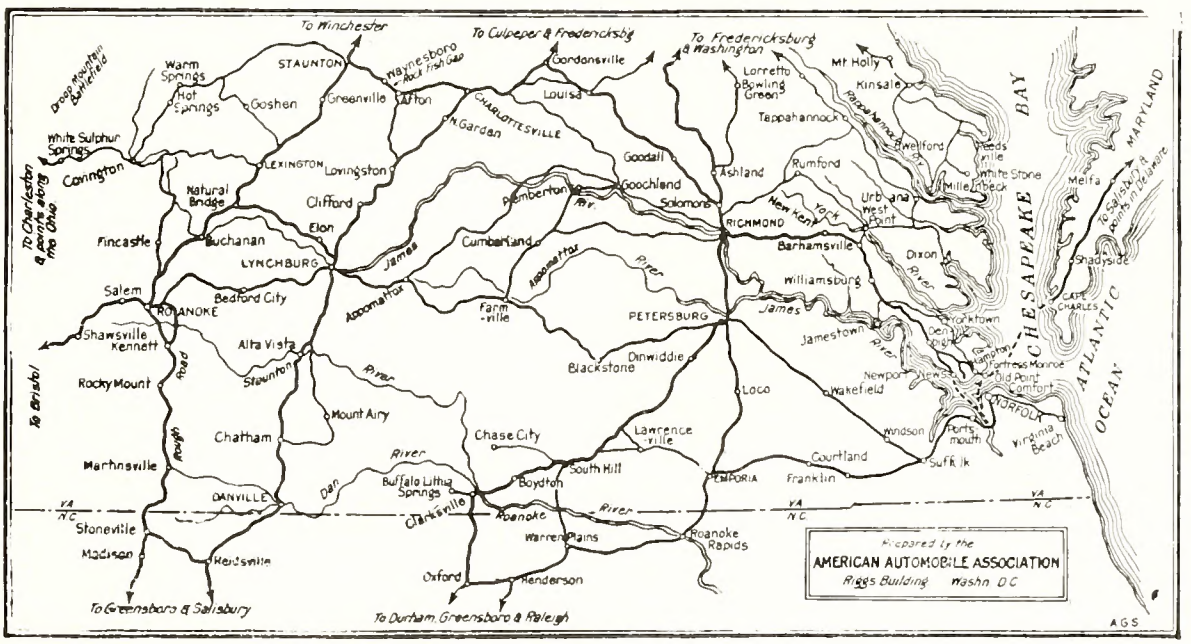
Motor Touring Sections of Virginia

Richmond a Center of Good Roads to Many Places of Great Historic Interest---Shenandoah Valley Replete With Natural Attractions and Scenic Beauty

WITH THE IMPROVEMENT of Virginia roads Richmond is destined to become an important touring gateway between the North and the South.

The city stands on land originally owned by Chief Powhatan, whose daughter was the famous Indian princess, Pocahontas, who married John Rolfe. Its early importance in colonial history, its record as the capital of the Confederacy and its location as a central point from which tours may be made to many battle fields, places it in the front rank.

There are many modern highways out of Richmond. Roads recently completed extend north to Fredericksburg and south to Petersburg. Reaching westward from the city are other highways that are being extended constantly and which will increase the pleasure of trips to the Shenandoah Valley regions. There is also a tourable road along that historic peninsula between the York and James rivers southeast to Old Point Comfort on Chesapeake Bay. These and other roads are shown on the accompanying map prepared by the touring bureau of the American Automobile Association.



Famous Places on the Peninsula.

On the road down the peninsula are many places of particular interest. Williamsburg is the oldest incorporated city in America, its charter being dated 1632. Here is the college of William and Mary, the second oldest in the Union, founded in 1692. Its alumni include seventeen governors, twelve cabinet ministers, five signers of the Declaration of Independence, three presidents and one chief justice.

Further on is Jamestown, on an island in the James river, the first English settlement in America, founded in 1607 by John Smith and Christopher Newoprt. It was here that Pocahontas, in 1614 married John Rolfe. The only landmark is the tower of the church built in 1620.

Continuing down the peninsula there is a detour taking in Yorktown, on the York river, where General Cornwallis surrendered to Washington, October 19, 1781, enacting the closing event in the Revolutionary war.

Old Point Comfort and Vicinity.

The very end of the peninsula is the site of Old Point Comfort, so named in 1608 by John Smith in gratitude because of its sheltered landing. Nearby is Fortress Monroe, its 80 acres making it the largest in the United States, and off the point is Hampton Roads, where the famous battle between the Merrimac and the Monitor was fought.

One of the greatest shipyards in America, wherein have been built more warships than at any other plant in this country, is located at Newport News. At Hampton is St. John's Episcopal church, built in 1668 and in which is a memorial window commemorating the baptism of Pocahontas.

Connected with these places at the end of the peninsula, is Norfolk, with much to offer tourists. It is interesting commercially as the tidewater terminal of eight trunk line railroads and fourteen steamship lines.

From Norfolk a number of delightful trips may be made over excellent roads, including those to Virginia Beach and Ocean View. Nearby is Lynhaven Bay, famed for its oysters, and Bayville, in which stands the oldest habitable dwelling in the United States. Not far from Norfolk are tablets marking the site where the English settlers first made their landing.

A little southwest of Norfolk is Portsmouth, where one of the largest navy yards of the United States is located, with a huge dry dock, perhaps the most important in the country. Four flags have flown over Portsmouth—United States, British, Colonial and Confederate. Twenty miles distant is Lake Drummond, in the Dismal Swamp, where the Post Moore received inspiration.

Petersburg, south of Richmond, has the record of

sustaining the longest siege of the civil war. Just outside the city is the Stone Bowl, known as Pocahontas' Wash Basin.

Over the Blue Ridge Mountains.

In the lower section of the Shenandoah Valley, beyond the Blue Ridge mountains west of Richmond, are Staunton, Lexington, Natural Bridge and Roanoke.

Staunton, birthplace of President Wilson, is a center for many trips showing nature's wonders. To the southeast, on the way to Richmond, over a grade that has recently been much improved for automobile touring, there is, at the summit, a mountain view which has been more than favorably compared with anything to be seen in the Alps. This climb over the Blue Ridge starts at Basic City, near Waynesboro, just after crossing the Shenandoah river. It is known as Rockfish Gap and is the point where early settlers saw and laid claim to the Shenandoah valley in the name of the King of England. The gap was also an important factor in the frequent passing and repassing of the federal and confederate troops between the Shenandoah valley and the campaigns in and around Richmond during the civil war.

On the way to the capital of Virginia are Charlottesville and Gordonsville, strategic centers of many important battles. Charlottesville was at one time the capital of the state. Among the men of fame who lived here were Thomas Jefferson, President Monroe and for a short period, Benjamin Franklin. Nearby are the birthplaces of these northwest explorers, Lewis and Clarke.

Natural Attractions of Shenandcah Valley.

The next notable point of interest down the valley, is Natural Bridge. This wonderful limestone formation is 215 feet high, 100 feet wide and 90 feet in its clear span, over a ravine of Cedar Creek.

Between Staunton and Natural Bridge is Lexington, with its Washington-Lee University and the Virginia Military Institute. In the crypt under the chapel are buried General Robert E. Lee and T. J. (Stonewall) Jackson.

Further down the valley is Roanoke, which in early days was known as Big Lick. There are many views from the surrounding mountains and that from Mill Mountain Park has been frequently commented upon as being superior in beauty to views along the Rhine and in the Rockies.

West from Staunton and Lexington is a section prolific in springs, famed for their healing value and noted for their gatherings of wealth and fashion from all over the world. Their social fame extends well back into ante bellum days.

When the east and west sections of southern Virginia are connected by modern roads with the North and West, the many points of scenic and historic interest will be visited annually by thousands of tourists who are now shut out because of the lack of travelling facilities. Each section will become a main artery for the increasing flow of travel moving south in the fall and back again in the spring.

Automobiles to the number of 7,791, carrying 35,676 passengers, came into Oakland, Cal., over the Lincoln Highway during one week of August, according to figures compiled by a watchman on Foothill Boulevard of that city. These visiting motorists were from 19 states, as their license tags showed, and came from every part of the country.

Make America Ready to Be Seen.

"America first must be made ready to be seen, before there can be any great response to the now widely heralded appeal to 'See America First!' " is the timely comment of Mrs. John D. Sherman of Chicago, chairman of the conservation department of the General Federation of Women's Clubs and included in the list of speakers at the National Parks conference held at the University of California in Berkeley, with the Hon. Stephen T. Mather, of the Department of the Interior, in charge.

In the call for this third conference its given purpose is "to consider, among other things, problems affecting the management, care, and protection of the National parks and National monuments generally, into which, of course enters the construction of roads and trails and the automobile situation."

The recent report of Secretary of the Interior Lane contains this reference to the modern form of roads travel: "The policy of the department in admitting automobiles to the parks, where road conditions make motoring safe, has met with general approval. It enables the traveling public to make trips to the parks more expeditiously than formerly, and in addition to materially increasing the number of visitors to the reservations has been productive of considerable revenue."

Every phase affecting the National Parks was touched upon in the Berkeley conference, the speakers for which included Dr. Benjamin I. Wheeler, president of the University of California; Robert B. Marshall, chief geographer of the U. S. Geological Survey; Major T. Warren Allen, U. S. Office of Public Roads; Mark Daniels, superintendent of national parks; Col. L. M. Brett, superintendent of Yellowstone Park; A. G. Batchelder, chairman A. A. A. executive board; Representatives E. T. Taylor of Colorado and J. Arthur Elston of California; besides department officers from every national park.

That the Department of the Interior intends to give comprehensive attention to the scenic assets of the country, insofar as it is possible with the funds at its command, appears certain, and with Europe forbidden ground for an indefinite period, it is inevitable that thousands of Americans will come to a realization of the superior wonders of their own country.

President John A. Wilson of the American Automobile Association, makes reference to the fact that not only those who have been in the habit yearly of going abroad will gain an acquaintance with the United States and Canada, but thousands of other people will indulge in interstate roads travel.

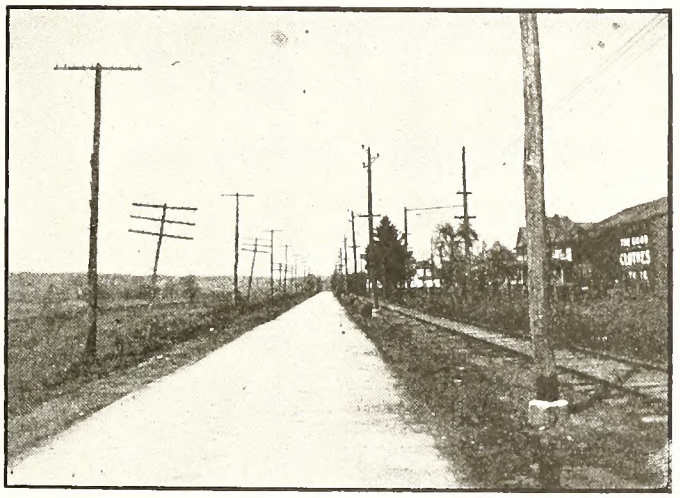
"In the pioneer days of the motor car its use was in great degree confined to people who had both means and leisure," says Mr. Wilson, "but a large percentage of automobiles are now possessed by substantial citizens who take only occasional vacation periods. Francis M. Hugo, secretary of state of New York, in commenting upon the fact that one-third of the 170,000 cars in his commonwealth are owned by the farm population, aptly refers to the automobile as implement of practical utility instead of luxury. Nevertheless, I have found in my quite extensive going about the country that our farm friends are not confining their motoring to short trips to the nearest town or railroad station. While highways should be built to shipping points, these arteries of communication to fulfill present needs must also permit business and social roads intercourse between centers of population. Both wants can be met and to contend for one exclusively is not the creed of organized motorists."

National Aid to Be Issue in Next Congress

CONGRESS will have the good roads question to answer at its forthcoming session, and the accumulating demand from all sections of the country makes clear that the issue must be met," asserted President John A. Wilson of the American Automobile Association, who was in Washington recently enroute to the Pacific Coast to preside on motor-car day at the American Road Congress.

"With over two million automobiles in use, the motorists now make up an army of road users entitled to equal consideration with all other citizens," says Mr. Wilson, "though some of us can remember an earlier period when we were considered a special class, subject to all kinds of hampering legislation and considered chiefly from a revenue producing standpoint.

"But we have finally obtained nearly all those rights which belong to the average citizen, and there is one thing in which we take a great deal of pride and satis-



One of Many Fine Roads Around Parkersburg, West Virginia

faction. In encouraging people to travel from town to town and from state to state, we have accelerated astoundingly the national viewpoint. Nevertheless, I must confess to a belief that comprehensive highways improvement has only begun, for it is now receiving deserved attention from a growing number of men who have most to do with the affairs of the nation."

Speaker Champ Clark of the House of Representatives in a recent "home-state" speech gave a characteristic talk in which he said:

"First and last tens of thousands of dollars' worth of wagons and buggies have been broken up and destroyed because of the bad roads in Missouri, and hundreds of thousands of dollars' worth of horses, mules, and oxen have been wasted in the same manner—perhaps the amount would run into the millions.

"I know this is not so lofty a theme as to discuss international questions of great pith and moment, but the problems of improving our roads is practical and can be solved. What's more, it ought to be solved. It is of immediate and pressing importance. Good roads mean increase in population—increase in wealth—increase in church and school attendance—increase in social affairs—in short, increase in the joy of living."

Former Secretary of State William Jennings Bryan in an argument against any extensive military defense expenditure set forth that $5,000,000,000 in eleven years "would gridiron the United States with hard roads twelve miles apart, so that no citizen would live more than six miles from a good road which would enable him to go anywhere."

Mr. Bryan also said in an interview at Omaha recently that it is only a question of time when the Federal Government will lend assistance in the building of interstate roads.

"The significant feature of Mr. Bryan's words is his reference to interstate roads," comments Chairman George C. Diehl, of the A. A. A. Good Roads Board. "This can be no other than the conception of a national system which will correlate and coordinate the systems of state highways, just as the state systems form the framework for the county and township systems of highways. The A. A. A. believes this an ultimate development, but hardly possible in the beginning. An interstate system would be tangible and impressive and would tend to unify in our present somewhat haphazard systems of highways. Mr. Bryan's utterance is an encouragaing indication of the trend of thought among the men who shape our legislative policies.

"Not long ago the chairman of the State Highway Commission of Maine, referring to Federal cooperation in good roads, asserted that the first expenditure in a state like Maine should be for connected seacoast roads which would permit of a quick mobolization of troops at any threatened point of attack. A similar argument had been previously put forth in regard to the Pacific Coast and the Mexican border. The great value of highways and automobiles in the European conflict has been completely demonstrated and these two factors are certain to figure in national legislation relating to military preparedness."

Missouri Mud Costly to Clay County.

Clay county, Missouri folks are finding that muddy roads cost the community too much in the way of delayed progress, so they are now pushing a campaign for a half million dollars for permanent highways. This county waked up when Kansas City investors began to put their money into farm lands in another county, farther away in mileage but much nearer in terms of accessibility, relates the Kansas City Star.

Dr. O. C. O'Kell and other leaders in getting the petitions have expressed a willingness to give up the district plan for the larger one.

"Here we are almost a suburb of Kansas City," Doctor O'Kell said, "and yet her rich men are investing their money in less desirable locations in Jackson county, because they can get roads to them. Until the last ten days this county has been closed to motor vehicles almost as completed as if its highways had been fenced. The men who have to haul over our roads have lost thousands of dollars.

"Excelsior Springs is one of the best produce markets in the country; yet the roads have been in such shape this year that we have actually had to use cold storage eggs and poultry, because farmers could not get to market with their produce."

New Jersey is hewing a road out of the Palisades along the Hudson River for a distance of four miles. The state has appropriated a half million dollars to carry out the work.

SOUTHERN GOOD ROADS
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DEVOTED TO HIGHWAY AND STREET IMPROVEMENT

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INOCULATE WITH GOOD ROADS.

This is a day of inoculation and vaccination. The people are beginning thoroughly to realize that prevention of disease by the vaccine route means a saving of life and money. The farmer is being taught rapidly that the way to cure his sick soil and put him on the road to permanent prosperity is to inoculate it with the bacteria vital to the production of good crops. Both of these methods have been and are prolific with results. The best way to cure a mud-sick community is to inoculate it with the good roads spirit. The better roads' bacteria will multiply just as rapidly as the little clover and alfalfa pushers. The experience of every community that has ever tried improved highways proves this. It has been so often said that there are exceptions to all rules, but here is a circumstance that proves this proverb has become outworn. Is there any man who can name a community that has once had a taste of better roads that would wish to go back to mud?

At the last meeting of the county commissioners of Gaston county, North Carolina, there were probably more farmers appearing before the board than at any other time in the history of the county. And every one of these came in support of a petition for a good road to be built through his community, out of a newly created fund provided by the sale of bonds to add to the $300,000 issued several years ago. The great majority of these farmers were from outlying sections of the county that less than ten years ago voted three to one against road bonds. But all these have traveled over some of the fine roads already built in the county and they now know the cost of mud in time and money.

One of the best farmers in Piedmont Carolina, who is now a great roads enthusiastist, 5 years ago spoke in different parts of his county against a bond issue for roads. The day previous to the election he went to another town in an adjoining county for a load of fertilizer. He had to travel over a mile of unimproved road in his county before reaching a three-mile stretch of macadam in the neighboring county. He loaded his wagon with a weight that his horses could easily pull over the good road, but the mile of bad road thoroughly exhausted them, although they were given more time on the one mile than the previous three. That man stayed at home election day and on the next day thereafter began agitation for another election. When the next road campaign came he saw every man in the township, and, largely as a result of his work, there were less than a dozen votes against bonds in that entire community.

There are many counties in the South that, taken as a whole, are far from progressive, but all of these contain progressive communities. These can start the ball rolling and the spirit will spread.

Still another convincing case appears in North Carolina. Mecklenburg started with good roads. Finally some of these highways touched Gaston county. The first good roads movement of consequence in the latter county began right where the Mecklenburg road ended. Gaston soon followed suit with a big bond issue. Mecklenburg's roads touched Iredell and that county fell into line. Gaston's roads went to the edge of Cleveland county and the spirit spread clear across that county and continued through Rutherford. Iredell touched up the edges of Catawba and that county voted bonds. Lincoln county found itself hemmed on three sides by progressive counties and voted overwhelmingly for better public roads. The result is that here are eight counties in a bunch that are becoming a network of magnificent highways, a section sought by motor tourists from all over the Southeast. The progress of these counties has followed along the routes traversed by good roads.

RESORTS AND GOOD ROADS.

The resort sections of America have learned more convincingly during the past year the value of good roads than ever before. The ascendancy of the automobile as a mode of tourist transportation has meant thousands of dollars to those vacation places reached by good roads. Those on the old hack lines or reached only by rail have missed much of the profits that would have come their way had they not been shunned by the motorist. Avery, North Carolina's youngest

county, has realized this and has issued $150,000 bonds for good highways to her resort places. The Exposition at San Francisco brought the same lesson to Ventura county, California, and a million dollar bond issue is the result. Anybody who owns an automobile despises mud above all else.

NAMING THE HIGHWAYS.

The building of great national highways throughout the United States is preserving for posterity some of the finest of the nation's history and tradition so that it will never be lost. The Lincoln and Grant highways are already largely built. The next great national road will likely be the Jackson Highway from Niagara Falls to New Orleans. Its southern line will be over the route traveled by General Andrew Jackson in his march to the battle of New Orleans. Kentucky is becoming aroused over the proposed Jefferson Davis highway to traverse the state. Through the West the great inter-sectional roads will be named after several of the old trails. Missouri will have the National Old Trails Highway, the Ozark Trail road and "The Trail of the Lonesome Pine." The Middle West and Northwest will come South over the "Dixie" Highway.

Dixie Highway Travel Enormous.

Touring over sections of the Dixie Highway even in its present condition, has given an insight into what may be expected when the highway is completed. Since the Dixie Highway movement was started just a few months ago the immense volume of publicity which has been given to the road and its construction has materially increased the number of tourists traveling over sections of the highway.

A citizen of Fredericksburg, Ind., took occasion to investigate the amount of travel along the Dixie Highway from New Albany to Paoli. In three hours between 8 and 11 o'clock on a Sunday morning, seventy-two automobiles passed, containing 468 passengers. The machines represented the states of Indiana, Illinois, Kentucky, Wisconsin, Georgia, Minnesota, Colorado, Texas and California. The persons who passed in buggies, wagons and other conveyances numbered 283, making a total of 751 persons passing the same point in three hours. It would be a safe estimate to place the number of persons who pass the same point on this section of the Dixie Highway on the day in question at 5,000. This amount of travel over this part of the highway was in face of the fact that considerable construction work was going on, just as it is along other sections of the highway. When the road is finally completed from Chicago to Florida the amount of travel will be many times that on which the count was made.

Autos Revive "Lost Towns."

The automobile and good roads in Missouri are bringing back to earth a great many "lost towns." During the middle of the last century there were several new railroad lines built to the north from St. Louis and across the state.

The once noted towns of College Mound, Bloomington, Newburg, Ninevah, Bethel, Philadelphia, Darksville, Florida, and Woodville were skipped by the iron horse, and soon forgotten. The town of Philadelphia, in Marion county, and College Mound and Bloomington, in Macon county, enjoyed about the same reputation in the fifties that Sedalia, Moberly, and Macon do now. They had schools and college, factories, many stores, church, hotels, newspapers, and the like. Bloomington had two newspapers and was the seat of government for Macon county. It was, possibly, the largest and best known of all. Two stage coach lines went through the town, there was a large brick courthouse, a public square surrounded by thriving stores, and many dwellings. Today you wouldn't know you were passing where Bloomington had been unless someone called your attention to it.

Bethel, a German communistic settlement in northern Shelby county, thrived wondrously along in the forties and fifties, and was forgotten.

Since the auto has come, and along with it the spirit for good roads, several of these towns have substantial indications of "coming back." The names of Philadelphia, Bethel, and College Mound, in particular, after a half century's sleep, are again getting in the papers with considerable frequency. The old inhabitants say: "I told you so," and are predicting all the good things the early-day promoters said were bound to happen.

Sagacious business men have discovered it is not a great handicap for a town to be from ten to twenty miles away from a railroad, if you have a good highway to it. Automobiles make daily trips to the railroad towns for passengers, mail, and merchandise, and the once lost town is getting practically as good transportation facilities as if on a railroad.

Philadelphia, which was established by "Col. Sellers" (William Muldrow) with so much hope in the thirties, is on a rock road running to Hannibal, and has daily motor service with that town. It is growing rapidly.

The same is true with regard to College Mound and Bethel. Perhaps the case of College Mound is the most significant of all. It was established long before Macon, and when the railroads came they missed it by twelve miles. The town had a big Presbyterian school, several hotels, and all sorts of industries. But the indifference of the railroads killed it dead until the automobile and good roads resurrected it.

College Mound has not only revived its school, but it has an orphanage, a newspaper, churches and more stores than it ever had.

The old stage coach from Glasgow to Des Moines no longer swings by, but scores of automobiles are coming and going every hour, and the streets are just as lively as those of any town of its size.

An energetic good roads club has seen to it that all the highways leading into the town are kept up in good shape. It is just as easy to get from College Mound to the railroad as it is to travel from the suburbs of St. Louis or Kansas City to the business center.

The citizens of these towns, which have been "called back to life" by modern progress, take daily newspapers, enjoy motion picture shows, and are in as close touch with the outside world as if railroad trains whizzed through every hour. They are no longer "lost." They are very much alive, and are glad of it. Many of them are admirably located to command the trade from a wide scope of country, and they are getting it. Hotels that had long been tenantless have been re-opened, and they are getting a good tourist trade. Stores are heavily stocked, and the merchants are busy.

The lost towns no longer cherish a grudge against the railroads. They pity them.

North Carolina's Interest in the Construction of Public Roads

By DR. JOSEPH HYDE PRATT

State Geologist and Highway Commissioner

IT WAS NOT UNTIL 1909 that North Carolina showed any real interest as a State in the construction of its public roads. Up to that time the road laws passed by the various General Assemblies of the State were purely local in character. Several attempts had been made to pass laws relating to the construction of roads, the use of convicts, wide tires, etc., but in every instance the acts had been so amended before their final passage that they only applied to a few counties.

It is only within the past ten years that the legislators representing the various counties in the General Assembly of the State have begun to realize that although they had been elected by and represent a particular county, yet their duties as legislators is not confined to simply questions of interest to their individual county, but they are expected and must consider questions of statewide interest, and if they are to do their real duty by the state they must consider such questions from the standpoint of the State and not of an individual county.

This idea of state-wide legislation in regard to economic problems may be said to have become established by the General Assembly of 1909. Public laws of North Carolina, 1909, Chapter No. 915 an act entitled "An Act to Promote and Stimulate the Construction of Improved Roads in North Carolina."

This act, however, was not passed without considerable opposition, yet it did pass and was applicable to the whole state. In this act the general assembly made an appropriation of $5,000 to the North Carolina Geological and Economic Survey, and authorized the State Geologist to advise with township and county authorities in the building and improvement of public roads, and to carry on a campaign of education in regard to the value of good roads, how to construct them and how to obtain funds for the construction.

The General Assembly of 1911 passed an act to provide for the construction and maintenance of the Central Highway in North Carolina, Public Laws of 1911, Chapter No. 58) to extend from Beaufort Harbor to the Tennessee line. The same General Assembly also authorized the construction and maintenance of the Charlotte-Wilmington Highway. (Public Laws 1911, Chapter No. 60.) While the state did not provide any revenue to assist in the construction of these highways, yet it did authorize certain appropriations by counties and municipalities and individuals which could be used in the construction of said highways. It also authorized the highway division of the North Carolina Geological and Economic Survey, one of the departments of the state, that it was their duty of selecting and designating the route of these highways.

Since the passage of these acts the Central Highway has been nearly completed, and a little work has been done on the Charlotte-Wilmington Highway.

In 1913 the state went a step farther in its interest in the construction of its roads, and the assistance it was willing to give in order to obtain such roads. For the first time in its history the state gave actual assistance in the construction of a public road. This was through the passage of two acts, one known as "An Act to Provide for the Construction of the Hickory Nut Gap Road" (Public Local Laws of 1913, Chapter No. 539); and the other "An Act to Provide for the Working of State Convicts on a Certain Road in Madison county." (Public Local Laws of 1913, Chapter No. 464.) In these two acts the General Assembly authorized and directed that State convicts should be detailed by the Council of State to construct that portion of the Hickory Nut Gap road lying in Henderson county, a distance of about 7½ miles, and the construction of at least 15 miles of highway across Madison county to take the place of the road which was formerly in the county, and which was occupied by the Railroad Company when the road was built by the State across that county. These convicts have been detailed for this construction work, and have nearly completed the Hickory Nut Gap Road, and have about 6 or 7 miles more of road to build in Madison county. The State has borne the entire expense of guarding, keeping, clothing and all other expenses of the convicts; the other expenses connected with the construction of the road having been borne by the county or township. In the case of the Hickory Nut Gap road the revenue necessary to supplement the work of the convicts in the construction work was raised by private subscription.

The passage of these acts was a very forward step on the part of the State in connection with its road work, and illustrates the advantage that has been made by the legislators in considering the interest of the state as a whole.

At the special session of the general assembly held in December 1913 another act relating to the public roads of the state, of statewide interest, was passed (Public Laws, Extra Session 1913, Chapter No. 37.) This relates to the employment of state convicts on the public roads of North Carolina. It authorized any county or township to obtain, under certain condition, said state convicts to use in the construction of their public roads. No county, however, could obtain the use of such labor in the construction of their public roads, unless the location of the highway had been made by one of the engineers of the Highway Division of the Geological and Economic Survey, or its engineer approved the location already made. The highway must also be constructed under the direction of an engineer of the State Geological and Economic Survey.

The passage of this act was another forward step in state aid or the interest of the State in road construction.

There was also passed at this extra session of the General Assembly in 1913 an act to provide for the construction and maintenance of the Salisbury-Raleigh Highway (Extra Session, Public Laws, 1913, Chapter No. 244.) In this act the Highway Division of the North Carolina Geological and Economic Survey were again charged with the duty of selecting and designating the route of said highway.

All these acts, which imposed duties upon the Highway Division of the Geological and Economic Survey,

demonstrated that the members of the General Assembly realized that as a state began to assist in any way in the construction of roads that the state immediately had an interest in the work, and it was necessary to safeguard this interest, unless the supervision of the work was put under a department that had already been authorized to carry on similar work. The mistake was made in not making adequate appropriation to enable this Department to do the work that it was requested to do. It all, however, called particular attention from year to year to the need of a State Highway Commission, and indicated that the members of the general assembly were beginning to realize the need of such a department.

In 1915 the State of North Carolina made a still greater advance in the question of state aid by the passage of an act of the General Assembly creating the North Carolina State Highway Commission. (Public Laws 1915, Chapter No. 113.)

By the passage of this act North Carolina takes her place amongst the other forty odd states that have such commissions, and by reason of such have indicated that the public roads of the state are an asset that the states themselves must be interested in and assist in constructing and maintaining.

The State Highway Commission consists of the following members: Governor Locke Craig, Chairman; Joseph Hyde Pratt, Secretary; Benehan Cameron, E. C. Duncan, T. F. Hickerson, W. C. Riddick, Guy V. Roberts; and W. S. Fallis, State Highway Engineer.

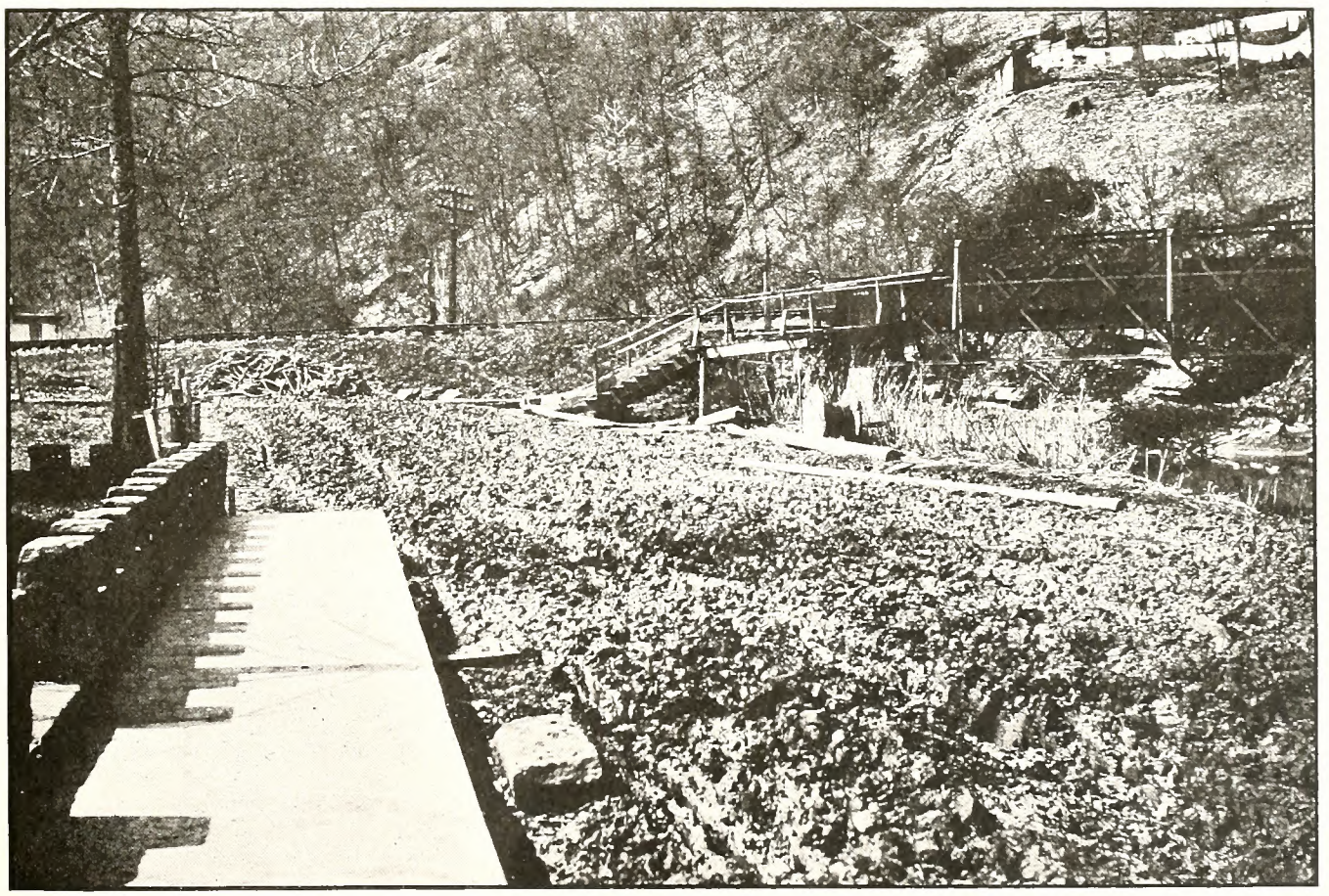
Since the organization of the commission nearly a million and a half dollars of road work has been placed under the supervision of the commission by the different counties and townships of North Carolina. The requests for assistance and supervision of road work has largely exceeded the expectations of those who have been peculiarly interested in the establishment of th commission, and it is believed that through the commission the road work of this state is receiving and will continue to receive a very great importance. There is no question but that supervision of road work by the State Highway Commission means increased efficiency and more roads for the money appropriated.

Another act passed by the General Assembly in 1915 of Statewide interest, was: "An act to Provide For the Construction of a Road across the Blue Ridge in McDowell County." The preamble of this act is given below because it is of interest as it especially calls forth the fact that a small link of road in the one section of North Carolina is of interest to the state as a whole:

"Whereas, the public road across the Blue Ridge in McDowell county from Old Fort to Ridgecrest is through a very sparsely settled country, and exceedingly difficult to build, and Whereas, this road is a connecting link in the central highway from eastern and central North Carolina to western North Carolina and Tennessee, and,

Whereas, it is a road of great scenic beauty and attractiveness that would be used by all the people of the state, travelling between the eastern and central section thereof and the western portion thereof; now, therefore,"

This interest of North Carolina in the public road problem has been gradual and consistent, and it is believed that this interest will continue to grow and ex-



B. & O. R. R., Street Bridge Across Creek and Muddy Earth Road at Hundred, Wetzel County, West Virginia. Mud Was Nearly Axle Deep When This Photo Was Taken

pand until the time comes when the state will be using all its able-bodied convicts in the construction of public roads, will be making appropriations to assist the counties in the construction of the main highways of the state and will use all of the money obtained from the taxes of automobiles in the maintenance of the main and through highways of the state.

North Carolina is beginning now, as a state, to take interest in interstate as well as intercounty roads, and this is evidenced by the passage of the resolution by the general assembly of 1915 in regard to the Southern National Highway, as follows:

"Whereas, a commission appointed by the Governors of all the Southern states met at Asheville, North Carolina, on February thirteenth, one thousand nine hundred and thirteen, and acting under the instruction and authority of the states whose commission they bore, designated the route of an all Southern Transcontinental Highway, which they named the Southern National Highway, and which runs as follows:

"Washington to Richmond, Durham, across North Carolina over the Central Highway of the state, Knoxville, Nashville, Memphis, Little Rock, Hot Springs, Dallas, Fort Worth, Sweetwater, Roswell, New Mexico, Mescalero, New Mexico, to El Paso, Texas, thence by Clifton, Phoenix and Numa, Arizona, to San Diego, California, and

"Whereas, so great has been the progress in the construction of the road that it is now almost completed from Washington to Knoxville, Tennessee, and an open and usable road from Dallas, Texas, to San Diego, California; with much of the intervening sections completed; and a relatively small mileage yet remaining to improve until it can be thrown open to trancontinental travel and

"Whereas, the Lincoln Highway is now traversable from New York City to San Francisco, vastly to the benefit of the northern part of our country; therefore be it

"Resolved, first, that the state of North Carolina hereby confirms the action of the Asheville Convention and adopts the designation "Southern National Highway," to become effective when similar action has been taken by the other seven states traversed by the route.

"Second, that greetings be sent to the State of Virginia, Tennessee, Arkansas, Texas, New Mexico, Arizona, and California, expressing the hope that by unity of action and concentration of effort this southern route may be put in condition in time for the transcontinental travel to and from the Panama-Pacific Exposition.

"Third, that North Carolina would welcome the extension of the work of the federal office of public roads, in its supervision of maintenance now in operation over the Southern National Highway from Washington to Durham, so as to include the highway westward to the Tennessee line.

"Fourth, that this state requests the co-operation of the other states in requesting the Federal Government in its prospective legislation to designate the route which has been authoritatively selected by the South, as the Southern National Highway and to co-operate with the states traversed in its establishment and maintenance as the Southern National Highway.

"Fifth, that the Governor of this state be authorized and requested to present these resolutions to the Governors of the respective states for the purpose of concentrated action to secure the result; and that a copy of these resolutions be sent to the legislators of the several particular states for their immediate consideration.

"In the General Assembly read three times and ratified this the 2nd day of February,, 1915."

In response to this Resolution the Legislatures of Virginia, Texas, and New Mexico passed Resolutions of response pledging those states through their part in obtaining the completion of this highway, and telegrams were received from Tennessee and Arkansas saying that their legislatures would take similar action in the near future. It is expected that Arizona and California will do likewise at their next session.

This interest of the state in interstate roads is a healthy growth, and will be one of the means of stimulating the state's interest in its own public highways.

Old Trails Road Marked.

The work of marking the Old Trails road from Los Angeles, Cal., to Kansas City, including the Santa Fe trail from Santa, N. M., was completed last month by Douglas C. Mitchell, superintendent of construction for the route and map department of the Automobile Club of Southern California. The iron posts used cost $35,000.

The National Old Trails Road Association undertook the marking of a highway across the continent. Judge J. M. Love and Frank A. Davis of Kansas City are president and secretary, respectively, of this organization. Mr. Davis will oversee the work between Kansas City and St. Louis. The sign posts are paid for by each county through which the highway passes.

Captain John Craft Praised.

Captain Joohn Craft, president of the Alabama Good Roads Association, the Alabama Legislature and the people of the state in general are congratulated on the act of the legislature in passing a resolution favoring a system of national highways, in a letter received from Charles H. Davis, president of the National Highways Association.

The letter reads:

"I wired you yesterday heartily in recognition of your good work before the Alabama legislature. I not only want to congratulate you personally for the national highways and good roads everywhere, but more particularly the people of Alabama in knowing that every member of the senate and house, representing the people of Alabama, passed unanimously the joint resolution favoring a system of national highways. We cannot get good roads everywhere excepting through first creating, building and maintaining a system of national highways, built and kept in good condition by the United States government."

A farmer in Sullivan county, Tenn., reports the Greater Iowa Association, had to haul barbed wire from Bristol to Kingsport, a distance of twenty-three miles. He found that with a two-horse team his maximum load was 500 pounds, and that three days were necessary to make one round trip. To haul one ton, therefore, required twelve days and, at $3 a day for the man and team, the cost was $36. This was before Sullivan county issued bonds for road improvement.

Under the bond issue, the road from Bristol to Kingsport was improved, so that the same team can now readily draw a ton to the load and make one round trip in two days at a cost of $6.

The ton-mile cost under the old conditions was $1.56, and this cost was reduced to 26 cents by the improved road.

GOOD ROADS NOTES GATHERED HERE and THERE

Albama.

Alabama is the pioneer state in the union in inaugurating the movement of designating certain days as Good Roads Days and observing the same. The Alabama Good Roads Association started this movement in 1911, when a resolution was introduced at its annual meeting in Birmingham calling upon the people of the state to observe these days. August 14th and 15th, 1912 were observed by over 50,000 people in the state. The starting of this movement aroused so much enthusiasm that they were observed continuously in Alabama for the years 1913-14-15. The example set by Alabama aroused interest throughout the nation and it is now estimated that over twenty states in the union have commenced to observe certain days as Good Roads Days.

The Alabama legislature recognizing the importance of these days have passed a bill designating August 14th and 15th as Good Roads Days in Alabama, and making it the duty of the governor of the state to issue a proclamation sixty days in advance calling upon the people and directing probate judges, boards of revenue, mayors and road officials to call upon their people to observe these days by working the roads and holding public meetings. It is also made the duty of all schools and public institutions to observe the days. The State Highway Commission is directed to issue a book and prepare a program each year. Governor Chas. Henderson has signed the bill and it is now a law upon the statute books of Alabama. The Alabama Good Roads Association has been active in pushing this movement and is to be congratulated over its success in securing the passage of this measure.

* * *

Connecticut.

"Fifty boys from the Connecticut Reformatory are building a road between Milldale and the reformatory, and possibly will go on with the macadam in Cheshire," states E. Kent Hubbard of the board of directors of the reformatory to a representative of the National Committee on Prisons and Prison Labor.

"We had a hard time getting the work started, as there was great opposition to it, but the board was determined to make the attempt and results to date promise success. When we began the work we expected that it would take six months, but now we look to see it finished in four.

"The Board has been very fortunate," Mr. Hubbard continued, in securing as superintendent of the reformatory, Charles Henry Johnson, who has been deputy warden under Thomas Mott Osborne at Sing Sing. Mr. Johnson has been helping Mr. Oborne in developing self-government among the prisoners at Sing Sing and will lend every aid to our Mutual Welfare League at Cheshire.

"The men detailed for the road work were selected by the League and do not wear stripes or any distinctive uniform, and they are taken to the work in trolley cars and have their dinner sent to them, but act as overseers of the work, not guards. We do not fear escapes, as the boys have given their word not to attempt to escape. Some few, of course, may not have sufficient intelligence to live up to the standards of the group, but most of the boys are putting backbone into the work and doing their part towards making it a success.

"There is no limit," Mr. Hubbard concluded, "to the amount of work that Connecticut prisoners can do on the roads should this first attempt be successful and we hope at the reformatory to work out a labor system profitable to the boys and also to the state."

The national Committee on Prisons and Prison Labor has for years been battling against the contract system which is in use in the Connecticut State Prison and most of the county jails. The Committee, therefore, looks to the work at the reformatory as a big step in the right direction and hopes through the efforts of Mr. Hubbard and his fellow members of the reformatory board to see right labor systems developed in all the Connecticut penal institutions.

* * *

Illinois.

Governor Dunne has promised to take under consideration a proposition to bond the state to the extent of $10,000,000 for the purpose of building one thousand miles of hard road.

The plan as contemplated, was that brought to him by thirty representatives of business men's and commercial associations of southern and central Illinois cities. They purpose to start the road at Cairo, lead north toward the center of the state, making the nothern terminus at Chicago; the main artery to have three cross sections at about equal distances from each other.

* * *

Kentucky.

The democrats of Kentucky, in convention assembled, put the following good roads planks in their platform:

Section 3. Good Roads—A Democratic General Assembly and a democratic governor have restored state aid to road building in Kentucky after a period of seventy-five years. In consequence, 104 of the 120 counties of the state are now preparing to build roads with state aid under state superivision. The state has given its guarantee that the roads built under state supervision will be built honestly and intelligently. Good roads mean an increase in the market value of the land in every community through which they run ;they mean a better price for farm products and a saving in the wear and tear of farm vehicles. They mean access to the church and the schools and thus better churches and better schools. They substitute prosperity for poverty, not alone for the individual, but for the community and the state as well. Within five years, if the present plan of road building is continued, every county seat in Kentucky will be reached by one or more roads constructed under state supervision, each forming a part of the state-wide system.

The democratic party pledges itself to a continuance of the state aid system of road building and to add to its effectiveness by more adequate supervision and to use its every effort to make available Federal aid to be used in connection with the aid furnished by the state and the respective counties.

Section 4. Convict Labor.—We favor the adoption

of the constitutional amendment authorizing the employment of convicts on the public roads of the Commonwealth. We favor the abolition of, or such change in, the Prison Contract Sytem as will make available at the earliest possible moment to the state and to the several counties the labor of such convicts as may be safely worked outside the walls of the penitentiary in the construction of public roads and in the manufacture and production of road material.

* * *

Maine.

"New England prisoners have been worked on the roads for the first time in Cumberland county, Maine," stated John C. Seales, Secretary-Treasurer of the Maine Automobile Association, "and the success of the work should receive the thoughtful attention of the state and county officials of New England."

'An average of 40 prisoners are worked from a central camp. The road construction is under the supervision of the State Highway Department, but the care, custody, discipline and feeding of the prisoners is under the direction of the Sheriff and County Commissioners. This coordination of the Highway and Prison Departments is in accord with the recommendations made by the National Committee on Prisons and Prison Labor to the Maine Automobile Association which fathered the necessary legislation.

"The construction work is on the state road to the White Mountains, about 20 miles from the jail at Portland. On a knoll the prisoners erected a camp large enough for 40 single spring beds with a wardrobe at one end. The men undress in this room and put their clean "nites" and hang their clothing on individual hooks; then the door to the room is locked. If a man should escape in the night all he would have to wear would be a cotton night shirt.

"The camp is erected in sections so that it can be readily taken down and removed to some other location. Close to the camp an old house was leased and a "lean-to" dining room, also in sections, built on. The house not only serves as a kitchen but as quarters for the guards and foremen. Particular attention is given to the sanitary conditions in and about the camp including bathing in a nearby pond.

"There is a marked improvement in the health of the men after they have been in camp a short time and when discharged they are fit to do a man's work anywhere. They are given an abundance of good plain food, the cost of which averages 45 cents per day per man, while at the jail the average cost is only 15 cents.

"The men are dressed like other laborers and there is nothing to distinguish them from an ordinary road crew. They are allowed a great deal of liberty about the camp. After supper they read, pitch quoits, play ball and do about as they please—however, sharp at eight o'clock they must be in the camp and prepare for bed.

"From a financial point every day's labor is worth at least $1.75, less the cost food, while in jail the county received only about 9 cents for the days the men worked and fed them at night. The men do as much work as ordinary laborers, which is remarkable as they are all short term men serving sentences from 30 days to 9 months and men of that class are not as a rule efficient workers.

"In starting a new camp considerable attention must be given to discipline for the first few weeks. In a short time, however, every thing becomes a matter of routine and the work progresses in a regular and systematic manner.

"The Almighty ordained;" Mr. Seates concluded, "that man should earn his living by the sweat of his brow. Why should not this law apply to those who have been before the courts for misdemeanor? The experiment in Cumberland county has proven beyond a doubt that it is better for the men and certainly it is better for the county—it only requires a little more thought and work on the part of the sheriff and the county commissioners."

* * *

Missouri.

State Highway Commisisioner Buffum announced recently that he has completed all arrangements for having what is known as the "blue book" highway between Kansas City and Louisville entirely dragged and graded by September 21. This highway is about 250 miles long and follows the Chicago & Alton Railroad right of way.

The commissioner said that he had made final and satisfactory arrangements for filling up every gap. From Louisiana on to St. Louis there is a permanently improved highway. There was a gap in Randolph county near Higbee, which was worrying the department, but this was adjusted at a meeting last month.

* * *

Texas.

The good roads campaign during the month of September was featured by a tour of two weeks, during which the gospel of good roads was preached in the interest of two permanent highways connecting San Antonio and Houston. The proposed routes would touch all the towns of the territory between these two cities. Included in the party were Mayor Ben Campbell, of Houston, Thomas A. Williams, Field Secretary of the National Highways Association, D. E. Colp, Secretary of the Texas Good Roads Association, who headed the party, representatives of the State Federation of Woman's Club and the club women of Houston. Speeches were made by different members of the party at all the towns touched on the trip from Houston to San Antonio and return. Three cars left Houston at the beginning of the trip but these were joined by others from the towns touched, until a great procession was formed for the entry into San Antonio.

The Kentucky Mountain Highway.

The subject of the Moutain Highway which is to run from a point near Pound Gap on the Kentucky-Virginia border line through the counties of Letcher, Perry, Breathitt, Lee and Estill to a connection at Richmond with the "Dixie Highway" is still being discussed in several counties.

Each county will hold a meeting during the next few weeks when plans will be discussed and arrangements will be made for the actual building of the thoroughfare.

Some of the counties will vote a bond issue to the amount necessary to build the road, as each county will be required to construct the highway through it.

In each of the five counties there are thousands of good roads enthusiasts who are agitating the Mountain Highway. The meeting in Jaekson a few days ago will result favorably for the highway, it is believed.

A new steel bridge across the Catawba river, at Mount Holly, N. C., has recently been completed by the counties of Mecklenburg and Gaston.

GOOD ROADS NOTES IN BRIEF

The first completed stretch of the official Dixie Highway in Illinois will be dedicated the ninth of this month at Danville, when Governor Dunne will speak. A banquet will be served.

$100,000 has been authorized for the construction of fifteen miles of gravel roads at La Fayette, Louisiana. The highway south of Lake Charles has been resurfaced with Tarvia. Several other Louisiana parishes in this vicinity are preparing to build fine roads. Calcasieu parish is making an effort to raise $300,000 for a bridge over Calcasieu river, in addition to the $900,000 for good public roads.

Davidson county, North Carolina, good roads forces won a final victory last month, when the state supreme court refused to grant a rehearing on the question of the validity of the $300,000 bond issue authorized by the legislature. The work of construction is now well under way in all sections of the county.

Tiger township, Oklahoma, in the midst of a rich oil region, is now spending $75,000 on roads and has recently voted $27,500 for a steel bridge over Cimarron River.

Peoria, Ill., citizens are signing a petition for a special election on a $1,500,000 bond issue for county good roads.

Since the beginning of the European war the older reservists of the Turkish army have constructed nearly twelve hundred miles of roads.

Ohio will collect a million dollars in taxes this year from autoists. All of this amount goes to the good roads' funds. There were 168,000 automobiles in the state Sept. 1.

New York state has completed half of the 12,000 miles of the great system of highways laid out to be built with $100,000,000 of state bonds. During 1914 over 150,000 non-resident touring cars were attracted to this state by good roads, and these spent millions of dollars there.

Sept. 28 and 29 were celebrated in Jacksonville, Fla., as Dixie Highway days. A great automobile parade, reviewed by the governors of Florida and Alabama, was a feature.

Avery, the youngest county in North Carolina, has begun the construction of $150,000 worth of macadam roads, which will make the resort places of that section available to motorists.

$250,000 will be spent in the construction of good highways in Summer county, W. Va., in the beautiful Greenbrier country, this amount having been voted by two districts.

Gaston county, N. C., is spending $150,000 in the building of sand-clay roads, this amount supplementing $300,000 previously spent for macadam and sand-clay.

The Macon, Ga., Chamber of Commerce is planning the construction of twelve automobile highways leading into Macon.

Hindman, Kentucky, votes this month on a bond issue of $75,000 for macadam streets.

Work has been begun on a modern road from the Rowan county, N. C., line to Badin, the great $12,000,000 aluminum plant. Construction is being done by the Stanly county road forces.

Mr. R. J. Reynolds, wealthy tobacco manufacturer of Winston-Salem, has let the contract for the construction of two miles of fine road from Winston-Salem to his new country palace, Reynolda. The road is 36 feet wide with a 16-foot concrete roadway. 200 barrels of cement are being used each day by the builders.

Walker county, Minn., will spend $200,000 in the construction of two highways, one 76 miles long and the other 28.

The Alabama Good Roads Association meets October 12 and 13 in the city of Birmingham.

Clinton county, Ky., has voted $50,000 bonds to construct that county's share of the "Dixie Short Route" from Cincinnati to Chattanooga.

Tale of a Rural Road

By DR. LILLIAL WYCHOFF JOHNSON

Trustee Tennessee Highway Association

ON A GLORIOUS Oetober afternoon I walked home with the teacher and a group of ehildren from a country school in Tennessee. The air was exhilarating; the leaves of the forest were so gorgeous in their coloring that we paid little attention to the roughness of the road, and only laughed as we picked our way over stones, jumped the small streams and ran down the hills. This was my first visit to that part of the country, and I wanted to buy land and live right there.

The next morning I awakened to find it raining; all day the rain fell steadily and heavily. When the teacher returned to our little settlement in the afternoon she reported that only the larger boys and two girls, who lived next the school, had been present; that the boys said the smaller boys and the girls could not jump those streams that looked so innocent the day before.

Hearing that a woman who lived up the branch was ill, I prepared to take her some medicine, but as I stopped at a near neighbor's on the way, I was told I could not reach on foot the home I was planning to visit, as the water was so high. Looking anxiously at the heavily falling rain, my neighbor said, "What will Sallie do, if the water rises so high the doctor cannot eross the crick—she's expectin' pretty soon now."

A second and a third day the rain fell. The faithful teacher plodded her way through the mud, over the short-cut through the sodden forest, carpeted now with those leaves which burgeoned so splendidly only two days before. Was it worth while to go to school for the four or five children who could get there?

The fourth day it cleared somewhat and I made my way to a neighbor's over the hill on this side of the branch. I tried to pretend I did not see the trace of tears on her face, while wondering what was the trouble and how I could comfort her. At last it came out. On one of those days of rain the son had driven the horse with a load of lumber to the station, and in going down a steep hill, made a slippery and treaeherous by the rain, the horse had fallen and broken his leg. No veterinary surgeon eould be found in the country, so they had to shoot the horse. Now this mother was wondering whether they would have money for warm clothing for the children, since they must buy another horse in order to get the crop in.

Oh! you town dwellers, as you look at your well-paved streets over which your children pass easily to a nine-months school, do you think of the country children who often cannot attend all the days of a short four or five months term beeause of the bad roads? As you summon the doctor hastily for any slight illness, do you think of the women who must go into the shadow of the valley of death alone, because a swollen ereek cuts them off from the doetor and from neighbors?

You eity-dwellers, whose wealth and welfare come largely from the toil and sacrifiee of the country, are you giving back a fair share to them? Why are your roads and your schools so much better than those of the open country?

Cleveland county, N. C., township, No. 3 votes Oct. 16 on a township bond issue of $30,000 to build good roads. This county has been adhering to the township unit plan and about half of them have already constructed highways.

SOUTHERN GOOD ROADS

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Object Lesson Road Work in 12 States

Federal Road Engineers Supervise Highway Models in Many Southern Counties

THE WORK done in 12 states named below in the construction of object-lesson roads by the Office of Public Roads and Rural Engineering of the United States Department of Agriculture, for the period from July 1, 1913, to December 31, 1914. The counties, save in the case of special post roads, defray the entire cost of materials and construction and the Department supplies the expert supervision. Forty of these object-lesson roads have been built during the 18 months covered by the report.

The work done in the several states is given in alphabetical order as follows:

ARIZONA.

Apache County: Construction work was begun on the Big Hollow Road, which extends west from St. Johns toward Holbrook, on August 28, 1913, and completed January 15, 1914. The length graded was 5,515 feet.

FLORIDA.

Dade County: On a bituminous-macadam road, beginning about one-fourth mile north of Lemon City, on the Biscayne Drive, 334 feet were surfaced during January and February 1914.

Palm Beach County: Seven sections of bituminous-macadam road were constructed, beginning at a point about 2 miles south of West Palm Beach, on the Miami-Quebec Highway, during April 1914. The length was 860 feet.

Lee County: Bituminous resurfacing work on the McGregor Boulevard leading from Fort Myers toward Punta rassa, was completed May 7, 1914. The road was treated for a length of 8,950 feet.

KENTUCKY.

Todd County: Work was begun on an earth road north from Elkton toward Claymour on October 16, 1914, and continued until December 5, 1914. The length graded was 1,900 feet.

MASSACHUSETTS.

Dukes County: During the month of August 1913, a section of the Makonikey Road in the town of Kilsbury was surfaced with sand-clay or topsoil. The length of the section was 320 feet.

The improvement of the State Road, extending west from Chilmark toward Gay Head Light, was completed on June 8, 1914. The length of the section improved was 11,600 feet.

MISSISSIPPI.

Coahoma County: A gravel road leading from Clarksdale northwesterly toward Friar Point was completed January 19, 1914. The length was 1,060 feet. A second section of gravel road, 2,640 feet long, leading from Clarksdale northwesterly toward Friar Point was completed January 29, 1914.

Sunflower County: A gravel road, 1,790 feet long, leading from Indianola northerly toward Faisonia was completed November 19,1913.

Chickasaw County: Work was begun on the Pontitock Ridge earth road leading from Woodland toward Pontitock Ridge on July 9, 1913. The representative of the Office of Public Roads remained until July 18, 1913, just long enough to get the work well under way. The length improved was 1,200 feet.

MISSOURI.

Newton County: Work on a chert macadam road extending from Neosho southward toward Pineville was completed December 19, 1913. For a distance of 2,000 feet the road was graded to a width of 26 feet in cuts, and 22 feet in hills.

NORTH CAROLINA.

Randolph County: A gravel road, 2400 feet long, leading from Asheboro north toward Randleman was completed December 19, 1913.

Northampton County: Work on 2,500 feet of sand-clay section on the Church Street Extension Road from Jackson toward Seaboard was completed November 3, 1913.

Burke County: Work on 5,700 feet of sand-clay road leading form Morganton to Lenoir was completed on July 26, 1913.

Edgecombe County: Work was begun on Main Street extending west from Trenton on September 6, 1913, and operations continued to October 3, 1913. The improvement consisted in grading and shaping the existing road and surfacing it with a sand-clay mixture. The road was entirely graded to a length of 3,600 feet. A portion of the road was partly graded for 7,200 feet.

Duplin County: The section of sand-clay road, measuring 2,000 feet, from Wallace toward Chinquapin, was completed on September 12, 1913. The second section, 3,100 feet, from Island Creek Bridge toward Chinquapin, was completed October 4, 1913.

Gates County: The section of object-lesson topsoil road from Sunbury toward Suffolk, 2,300 feet, was completed December 2, 1913. Work on a section extending from Sunbury toward Milldam was continued to January 14, 1914, when 1,750 feet had been graded.

Davidson County: Work on a topsoil road from Thomasville toward Randolph county was completed

on September 20, 1913. Three thousand five hundred feet were graded and 1,200 surfaced.

OKLAHOMA.

Okmulgee County: Work on 5,600 feet of earth road leading from Okmulgee toward Henryetta was completed in July 1913. A stretch of earth road 4,820 feet long from Okmulgee toward Henryetta was graded in August, 1913.

Beckham County: Work on 4,000 feet of the Sayre-Delhi sand-clay road was completed February 11, 1914.

SOUTH CAROLINA.

Anderson County: Work on 2,300 feet of sand-clay road from Anderson City line westward was completed November 14, 1913.

TENNESSEE.

Gibson County: Work on 4,200 feet of earth road from Cades toward Trenton was completed August 21, 1914. Work on 17,600 feet of earth road extending from Milan toward Cades was completed August 18, 1914.

Texas.

Kinney County: Work on surfacing with gravel 1,500 feet of the Spofford road from Brackettville toward Spofford was completed May 6, 1914.

Caldwell County: Work on 8,975 feet of gravel road from Lockhart toward Seawillow on the Gonzales road was completed on August 7, 1914. A second gravel road, of 9,680 feet was built at Lockhart on the League Line Road from Burdette Wells Road toward Luling and completed on July 7, 1914.

Comal County: Work on 4,600 feet of gravel road extending from New Braunfels toward Seguin was completed May 28, 1914.

Uvalde County: Work on a gravel road from Uvalde toward Sabianal was continued until February 6, 1914. A length of 4,300 feet was graded, and 2,200 feet surfaced with gravel.

Bee County: Work on a mile of adobe and sand-clay road from Beeville toward Oakville was completed on April 20, 1914.

Freestone County: The work of constructing a sand-clay road, 5,330 feet long, east from Teague toward Dew was completed April 18, 1914.

Erath County: Work on a gravel-macadam road extending north from Dublin toward Stephenville on October 29, 1913 was continued until December 21, 1913, when it was stopped on account of excessive rains which, with the nature of the soil, made work impossible. The road was graded 30 feet wide in cuts and 21 to 24 feet in fills for a total distance of 2,600 feet: of this distance 4,000 sqnare yards were completely graded.

VIRGINIA.

Prince Edward County: A cement-concrete road extending from Farmville toward Hampden Sidney was graded 24 feet wide for a distance of 1,450 feet, and surfaced with concrete 16 feet wide for a distance of 515 feet. The work was completed October 18, 1913.

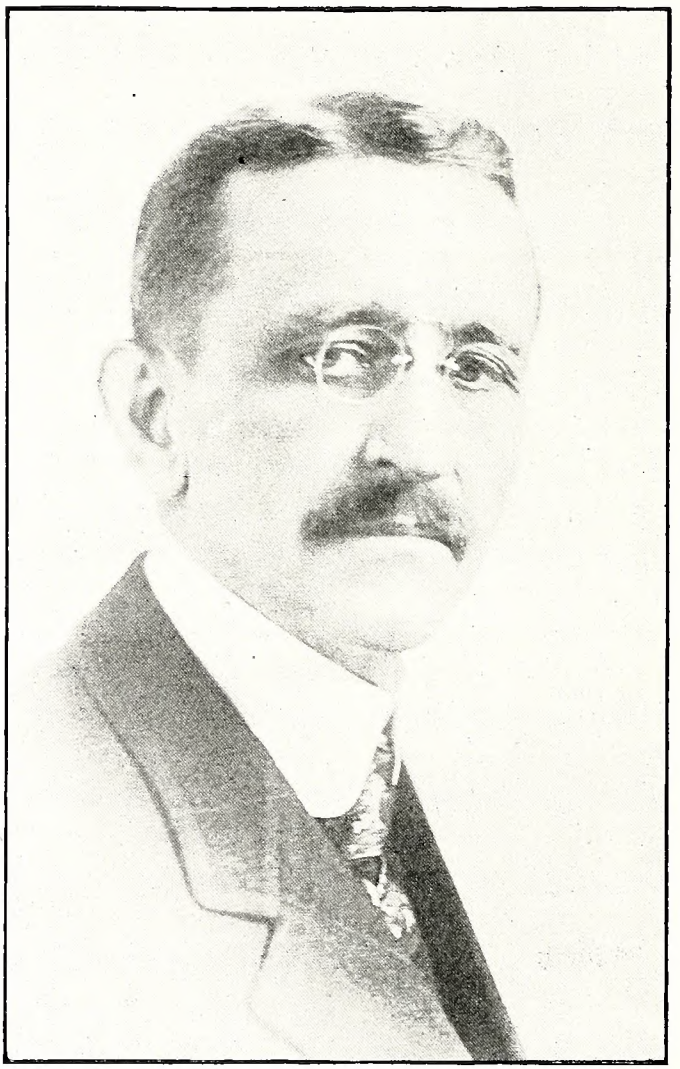
Augusta County: A bituminous-macadam road leading from Staunton toward Middlebrook, 1,700 feet long, was begun September 16, 1913, and one section was turned over to the local authorities on September 29, 1913.

Fauquier County: A macadam road, 2,800 feet long, extending from the depot at Rectortown north to Marshall Road was completed November 1, 1913.

Appomattox County: Construction work was begun on the Oakville topsoil road, extending northwest from Appomattox toward Oakville, on May 15, 1913, and supervision by the office representative ended May 14, 1914. The road was graded to a width of 28 feet in cuts and 20 feet in fills for a distanee of 18,100 feet.

To Locate Jackson Highway.

So strenuous has become the fight for the Jackson Highway from the Great Lakes to New Orleans and the Gulf of Mexieo, that the Jackson Highway Association in its meeting at Nashville had to call in the aid of neutrals to settle the friendly controversy. The committee named consists of W. H. Crim, Indiana, E. G. Dent, Kentucky, W. L. Brown, Indiana, and a man to be selected from Ohio. These men are from north of Nashville, where no contest will be made, as the



PETER LEE ATHERTON

President Jackson Highway Association, Louisville, Ky.

route has already been practically selected to Niagara Falls. Nashville is the old home of "Old Hickory" Jackson, so it is settled the great military highway must pass through that city. However, Alabama, Mississippi and Louisiana are all involved in the contest to secure this road south of Nashville. The committee, assisted by a Federal road engineer, began their work October 5. They will go over every mile of the contested route and the claims of the different contenders will be submitted to them. Their selection will be submitted to the representatives of all the states through which the road passes and they will vote for the permanent loeation.

Road Men Favor the Forest Reserve

Southern Appalachian Good Roads Association Recommends Ten Millions More for Purchases; Then Good Roads in This Great Playground

THE Southern Appalachian Good Roads Association at its meeting in Bluefield, West Virginia, last month heartily went on record as asking Congress for ten million dollars for purchase of additional lands in the Appalachian country as a national reserve, through a re-enactment of the Weeks' bill. Resolutions were passed asking the Senators and Representatives of the nine states represented in this meeting to do all in their power to secure at least two million dollars a year for five years. This meeting, which was very largely attended, also went on record for a large Federal appropriation for a national system of good roads, a great national road from Maine to Louisiana through the Appalachians and a system of roads through the national forest of this region among other things.

Lexington, Ky., was selected as the next place of meeting. Asheville, N. C., was put in nomination, but withdrawn when a test vote was had on an amendment. Incident to the contest the Kentucky delegation invited Mrs. James O'Keeffe to sing "My Old Kentucky Home," which captivated the convention.

Officers Elected.

The following officers elected:

President and Treasurer, Joseph Hyde Pratt, Chapel Hill, N. C.

Vice president at large, Henry Roberts, Bristol-Va.-Tenn.

State vice presidents—John A. Smith, Georgia; J. N. Fisher, Tennessee; S. H. Webb, North Carolina; Hon. H. C. Stuart, of Virginia; Jas. Maret, Kentucky; J. M. Jenkins, South Carolina; John Craft, Alabama; Blake Taylor, West Virginia; S. J. Kitchens, Maryland.

Executive Committee—George S. Powell, North Carolina; Prof. S. B. Slack, Georgia; W. E. Myer, Tennessee; W. S. Fallis, North Carolina; H. B. Varner, North Carolina; S. L. Von Gemmingen, Virginia; A. D. Williams, West Virginia; C. C. Crabb, Kentucky; E. J. Watson, South Carolina; G. P. Coleman, Virginia; W. S. Keller, Alabama; H. G. Shirley, Maryland; M. V. Richards, Washington, D. C.

Secretary, C. B. Scott, Virginia.

Assistant Secretary, Miss H. M. Berry, North Carolina.

A resolution of endorsement was passed of a highway through West Virginia from Bluefield to Wheeling to be known as the "North and South" highway.

The committee on resolutions reported the following, which were adopted:

Federal Aid Approved.

Whereas, With the exception of about $500,000 the appropriation the Weeks law of 1911, has been used in the purchase of lands in the Southern Appalachian and White Mountains, for the purpose provided for in said Weeks law, and,

Whereas, It is generally recognized that these lands have been economically purchased and wisely administered so far as the present conditions as to areas and contiguousness will permit, and,

Whereas, It is in the interest of public benefits and economy that these purchases be continued until the work so well began by the national forest reservation is completed. Now therefore, be it

Resolved, By the Southern Appalachian Good Roads Association representing the states of Maryland, Virginia, West Virginia, Kentucky, Tennessee, Alabama, Georgia, South Carolina and North Carolina, that the senators and representatives from the states named be urged to use their efforts in securing from congress an appropriation of $10,000,000, at the current rate of $2,000,000 a year until 1920, for the purchase of additional lands under the Weeks law.

Resolved, That in order to give the people the full use of these public lands for recreation and pleasure,

Improper Maintenance, by Township Refusing to Co-operate With Office of Public Roads

we favor the construction by the government of a system of highways through these national forests, to be laid out with the view of the states and counties constructing the connecting links, and that we petition congress to make an appropriation for this purpose, believing it to be the duty of the government to develop this important part of the natural resources of these mountain regions.

Resolved, That the proposed federal aid bill, prepared and adopted by the American Association of State Highway officials, be approved and endorsed and that we request the senators and representatives in congress from the states composing this association to lend their most vigorous aid and influence in its passage at the next session of congress, and that a copy of this resolution be forwarded to the senators and representatives from each of the said states.

Resolved, That this association endorse and promote the construction of a highway to be known as the Appalachian highway to follow the crest of the Appalachian region extending from Maine to Louisiana and passing as far as practicable the following towns: Beginning at Calais, Maine, to Bangor, Maine; thence to Montpelier, Vt.; thence to Lake George, N. Y.; thence to Albany; thence to Williamsport, Pa.; thence to Oakland, Md.; thence to Elkins, W. Va.; thence to Bluefield, W. Va.; thence to Bristol, Va.-Tenn.; thence to Asheville, N. C.; thence to Tallulah Falls, Ga.; thence to Birmingham and to New Orleans.

Resolved, That the matter of more definite and uni-

Delegates to Southern Appalachian Good Roads Association, Bluefield, W. Va., October 14-16, 1915

form traffic laws, road laws and laws relating to prison labor on the public roads be brought to the attention of the general assemblies of the states composing this association and that a committee be appointed, to be known as the legislative committee with one member from each state embraced in the Southern Appalachian region to take up with the legislatures of the respective states composing this association these and other matters of legislation referred to in these resolutions.

Resolved, That we approve and endorse the use of prison labor in the construction and maintenance of public roads, and we recommend that such methods of handling the prison problem be adopted by the respective states embraced in this association as will be to the best interests of society.

Resolved, That this association recommend that the states embraced in the Southern Appalachian region should apply the funds derived from the registration fee or license tax on all motor driven vehicles through the respective state departments to the maintenance of improved roads.

Resolved, That this association extend to the Bluefield Chamber of Commerce and Mr. W. L. Shafer, its secretary, hearty appreciation for the courtesies extended and assistance rendered in making this, the seventh annual meeting, uniformly successful, and especially be it resolved that we extend to the Chamber of Commerce our hearty appreciation of the excursion into the Virginia-West Virginia coal fields, whereby an opportunity was afforded the members of this association to see the wonderful motor-driven trains of the Norfolk & Western Railway Company, and resolved that we thank Mr. L. E. Johnson and the Empire Coal and Coke Co. for courtesies shown by them in this connection.

Resolved, That this association extend to the Goodykoontz Drug Company its hearty appreciation for the courtesy extended by it in keeping the members of the association constantly supplied with refreshing drinks; also to the Bluefield Grocery Company, Flat Top Grocery Co. and Huff, Andrews & Thomas for the courtesies extended by them in furnishing the members with cigars.

Resolved, That the association extend to the press of the states of this territory its hearty appreciation for the courtesies extended and assistance rendered by it.

Resolved, Further, That this association extend its gratitude to the various social clubs of Bluefield and all the citizens of Bluefield for the kind hospitality extended by them in making our visit one of pleasure and profit.

Terrell county, Texas, has begun the construction of roads from funds provided by a $300,000 bond issue.

The Merit System in Highway Work

By JOSEPH HYDE PRATT

Secretary State Highway Commission of North Carolina

IN OPENING this discussion on the subject, "The Merit System in Highway Work," I am doing so without any reference to the paper of Mr. Dana, as I have had no opportunity of reading it.

At first glance we are apt to think of this subject as applying simply to "Civil Service" appointments and the inauguration in a state of the civil service method governing all appointments. I am not, however, considering the subject from this standpoint.

I am thoroughly convinced that a "merit system" can very profitably be made applicable to Highway Work in any state and in such a manner that it will permeate the whole road organization, from the highest official to the cheapest laborer.

There are certain fundamental principles, however, relating to road construction and maintenance, that must be recognized by the people of a state before any satisfactory results can be obtained:

I. That the construction and maintenance of public roads must be considered as a purely business proposition.

II. That satisfactory results can only be obtained by having experienced men in charge of the work.

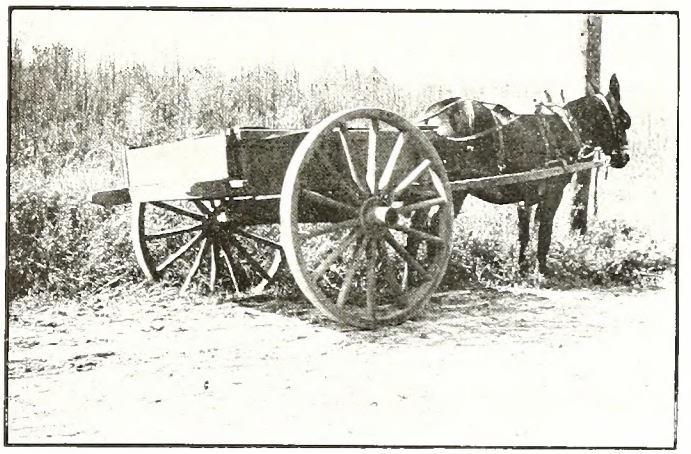
III. That the road work can not be used as a political foot-ball, and the road forces used as a medium for paying political debts and, at the same time, the people get a satisfactory expenditure of their money and a good system of roads.

It may be, that in my treatment of this subject, I shall seem to depart somewhat widely from it and to discuss certain subjects that have been assigned to others, but in doing so, it is only to be able to emphasize more fully, certain points of my own subject that I wish to bring out.

As a business proposition, it seems to me that it is necessary that we should consider our subject applicable to the very beginning of a road organization, namely the members of the "Highway Commission."

This commission should, as far as possible, be non-political and made up of men who are interested in the road work of their state, and so appointed that only a certain percentage of their number shall retire at one time, and this commission shall have a similar relation to the highway work that a board of directors has to the work of their corporation. In some states the members of the highway commission are appointed directly by the governor of the state and represent the state at large—in others they have to be appointed from certain districts of the state so that each section of the state will be represented on the commission. Members of the commission are sometimes designated by the general assembly of a state; in certain instances they are members of the Council of State, in others they are professors of civil engineering of the state university and colleges; and in some states it is a combination of both. In several states the personnel of the commission is so regulated that at least a certain percentage must be of the minority political party of that state. These varied methods of forming a highway commission have been brought about, undoubtedly, by the people beginning to realize that their highway commission must be appointed or made up in the interest of the highway work of their state. As the people realize the necessity of this and demand it, they can and will get the kind of a commission they want. The members of the commission should serve for at least four and properly six or eight years.

To this Commission should be given the authority of the employment of the State Highway Engineer or State Highway Commissioner, for, with a commission as outlined above, much better results will be obtained by its appointment of the engineer, than if he is appointed by a governor, whose term of office may be only two years. To the commission should also be given the authority to designate the salary of the State Highway Engineer or State Highway Commissioner and all other employees. With this authority, the commission is in a position to obtain the services of an engineer who is in every way qualified to fill the position, and he must be a man of wide experience in highway work and also have executive ability. I believe that such a commission as I have mentioned, will appoint the state engineer on account of merit and not for political reasons; for worth and not for favoritism.



Wake County, N. C., Patrol Outfit

The value of such an engineer to the state obtaining his services, rapidly increases with his length of service and, therefore, it is to the material advantage of the state to retain the services of such a man, and the engineer must have some assurance that the character of his work will determine his length of service.

Politics Should Not Control.

When the engineer is appointed by the governor there is very apt to be a change of engineers with change of governor, particularly if there is a political party change at the same time. With the appointment by a commission, as outlined above, there is but little chance of change of state engineer even with change of political party. Many state universities are governed by boards of trustees, appointed by the general assembly or governor and this board elects the president of the university. We do not expect this president of the university to be changed because a new governor has been elected or because the other politi-

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Paper Read Before Pan-American Road Congress, Oakland, Cal., September 26, 1915.

cal party has come into power. Why cannot the same procedure be expected in the appointment of a State Highway Engineer? I not only think we should expect it, but we will have it. The people of a state would not stand for the change of the president of the university because of a political change in government, and the people are not going to stand much longer such changes in State Highway Engineers and similar officials. The people will dictate when aroused and they are now dictating that political changes in government shall not cause changes in our highway forces.

To our State Highway Engineer should be intrusted the selection of all others who are to carry on the road work of the state, their appointment being subject to the approval of the commission. This, again, is in accord with the selection of professors, instructors and assistants by the president of the State University.

Again the State Highway Engineer must have the authority to discharge any and all employees connected with the road work. Many a State Highway Engineer today is handicapped in his work by having in his department, men who are ineffieient, but for political reasons must not be removed from office. This is wrong; is not fair to the engineer, and it is decidedly not in the interest of the people of the state.

In the selection of his assistants, the State Engineer must of necessity obtain such men as are qualified to do satisfactorily, the work required of them, and, being in a position to assure them that their length of service and remuneration, will be dependent upon their ability and development, will enable him to secure a higher class of men for the work. An assistant engineer, who continues in the service of the State Highway Engineer, should become of more and more value to him and to the work of the state, and, if he does not develop in this way, his services either will not be needed or he will be retained with no advance in salary.

Permanency of employment of road officials is, unquestionably, in the interest of economic road building; while a constant change by a state of its highway engineer is to be deplored because it will usually mean a constant change of policy, instead of a continuing and expanding policy, yet it is almost as disastrous to a state's road work for the road forces to be constantly changing.

Compare Massachusetts with a continuing policy, with New York, with a changing policy, and the resultant road work is all in favor of Massachusetts.

The merit system is not only applicable to the engineers, but, also, to superintendent, foreman and in fact to every man on the job.

Work for Genuine Results.

A superintendent's value is dependent upon how successfully he can follow the instructions of the engineer and handle his construction and maintenance forces, and this latter will depend largely on how wisely the superintendent has selected his foreman, who is in actual charge of the laborers. It is practical for the engineer to keep in close touch with all construction work so that by means of a system of "cost accounting" he will know accurately the value of each foreman, and if a certain foreman is not obtaining similar results in the same kind of work and with similar equipment as the other foremen, then he is not the man for the place. I could cite instances where counties have saved thousands of dollars from the fact that the engineer was able to know what his superintendent and foremen were worth to him; and, on the other hand, we have instances where counties have, undoubtedly, lost as much as fifteen thousand dollars and more of the value of a two hundred thousand dollar bond issue, by not keeping an accurate cost account.

These men, realizing that their employment is dependent upon themselves and that, if they make good, their employment is practically continuous, will give better and better results the longer they continue in the service of the engineer and consequently are of more value to him. Are they not, therefore, worth more money to him? And is he not warranted in paying them higher salaries?

In my own state, North Carolina, we are inaugurating a system by which our better superintendents and foremen are kept constantly at work by transferring them from county to county and we are now in a position where we can command the services of the best of these men.

On Using the Road Drag.

The state highway engineer of Washington has sent broadcast over that state instructions for dragging the earth roads this fall and winter. He says:

"With the fall rains comes the time when the need for maintenance on earth roads becomes very apparent, and the split log drag can be used to the best advantage.

"Drag the road when the soil is moist and mellow, but not when it is dry and stieky. The earth should move freely along the sides of the slab. If the roadway is extremely full of ruts and holes, it is best to drag once when the surface is slushy. Clay and water, when puddled in an intimate mixture, becomes tough and impervious to water, and will gradually get hard if compact in this condition.

"It has been shown that this puddled earth, when compressed and dried, becomes extremely hard. On these facts rest the value of dragging the road. When road dragging is properly done, it produces a smooth surface, filling up the ruts, holes and hollow places. As a small amount of material is always pushed to the center of the road, the surface will present an even, round appearance, over which the water will readily drain, and subsequent dragging will be more effective, and will result in a better maintained surface.

"As water is the natural enemy of a road, two things should be kept in mind—the shaping of the road so that it will shed water, and the water-proofing qualities of the material in the road to the end that the minimum amount of moisture will soak into the roadbed.

"Because of the loose character of the material of which earth roads are composed, running water will soon wash away the dirt and form gullies. On the other hand, standing water saturates and softens the surface. Experience has proved that dragging the road is one of the best means that can be used in the improvement of these conditions."

Aransas county, Texas, by a vote of 195 to 9, has authorized the issuance of $300,000 worth of bonds to construct the Rockport-Lamar Causeway. This bridge, which will be 13,000 feet, will be the longest in the state of Texas.

This year Massachusetts will complete 60 miles of new State highways. This work is done under an appropriation of $5,000,000, of which $1,000,000 is available every year up to and including 1917.

Hurrah for the Dixie Highway!

By JAMES KEELEY, Editor Chicago Herald

HURRAH for the Dixie highway! Whatever we neglect let's not forget to push along the big plan for a highway right through the heart and hospitality of Dixie—a magnificent road that will bring the sections together ever closer than they are now! "If we could visit each other in autos better we would love each other more," as the late President McKinley might just as well have put it. There is nothing like visiting to promote neighborliness and good fellowship. And these days there isn't anything that facilitates visiting like an auto and a good road and a smile of cheer and friendship along at the other end of it, as Frank L. Stanton might have said.

So all aboard and hurrah for the great Dixie highway that means so much, and for the other lesser highway that are sure to be built in a network all over the south to connect with the main road when it is finished! There's a lot to see and think and feel and enjoy on all the big and little trips that stretch before the visitor to Dixie. Drop off at Louisville and see—if he isn't too busy—that combined southern and national institution—"Marse" Henry Watterson—at work maintaining the principles of democracy "regardless" around at the Courier-Journal office! Enjoy the thoroughly southern atmosphere; don't be surprised if perfect strangers speak to you as they had known you for years. See the great tobacco warehouses, with the representatives of foreign governments present to buy the staple for the government monopolies of their respective countries. Look at the old Galt House—one of the moset famous of old hostelries, and then at its modern and magnificent successor. But perhaps the old house has vanished from the scene since the editor of the Herald was in Louisville. No matter; there's a lot of other things to see.

Drop over to Lexington, in the world-famed and well-named bluegrass region of Kentucky; region full of colonels and fine horses and handsome women that make even the colonels and the race horses and the beautiful meadows look small. Cumberland Gap and Virginia—don't forget them. Speed on down to Tennessee and see Nashville—beautiful Nashville seated on her hills—full of charming women and real old southern hospitality and beautiful trees and polities and rich in historical associations; where the home of "Old Hickory" is presented as a shrine. Cut over to Chattanooga and see the great national park—once the scene of a great conflict, now the common gathering place of united Americans of all sections, alike proud of the heroism of both sides. See Memphis if possible, and its unequaled storage facilities for cotton. We hear a lot of talk about cotton in the north. There's

Convict Gang Hauling Stone to Complete the Dixie Highway in Floyd County, Georgia

a chance at Memphis in the proper season to see more cotton stored than anywhere else in the world. Drop over into Arkansas and hear them "euss" Opie Read and point out the real Arkansas, with its rich lands and varied resources, as opposed to the Arkansas of that pleasing writer's fiction.

Back to the east and to the Carolinas with their mountain scenery and their combined summer and winter resort climates. Spend a day or a week breathing the delightful odors of the old rose gardens of Charleston. Try a slice or two of the celebrated Lady Baltimore cake, immortalized and localized in Owen Wister's story. Taste the pleasures of genuine southern hospitality and enjoy the charm of rare and gracious southern womanhood. Drop on to Atlanta and see what a thrifty, enterprising and progressive city it is. See Birmingham, the Thawless Pittsburgh of the South. And don't forget that in Atlanta you are in the land of Uncle Remus—that eternal friend of childhood, who has made the folk tales of the forests of Africa a precious part of the possessions of another race. Look at the wonderful old shell roads down in Georgia and Florida. Spin onward to Jacksonville, St. Augustine and Miami—each with notable attractions.

Then westward ho! along the coast of the great Mexican Gulf to Pensacola, quaint and old and curious: Mobile, full of charm, and to old New Orleans—treasuring the memory and bearing the evidences of three national sovereignties. See the old Cabildo and the little balcony on which the transfer of Louisana to the United States was made. Look out over the old "Plaza de Armas," where "Old Hickory" gathered local forces before marching down the river to make a stand against the British forces. Go down to the old fields where the battle was fought that gave American arms new prestige in the war of 1812—and where, incidentally, at least one of the most effective batteries was manned by the patriotic pirates of the old Lafitte band. See the old cathedral, the old French market and all the rest; and don't forget that to the west lies the Acadian country of Louisiana—Evangeline's country—and to the west that great state of Texas, the state that found a way to deal with the Mexican problem very effectively about seventy-five years ago, and wonders why the whole country can't do it now. Visit, if you can, indomitable Galveston, with its sea wall that beats back the ocean's roaring tide—Galveston, that rose so splendidly from the wreck of wind and rain not many years ago. And Houston—example of enterprise and prosperity—But the list grows all too long. Texas is not a state; Texas is a world.

Yes, all aboard for the Dixie Highway and the whole south! See the cotton fields in bloom—a mass of colors—or, better still, when the plant is more mature and the bolls have opened and exposed their fleeces to the sun. See the broad-leaved magnolia trees and breathe the dominating perfume of the big open blossoms—white that a single touch will turn to dark—on the evening air. See the climbing roses at Biloxi in midwinter and pluck a ripe orange from the tree in January or February in Louisiana or Florida. Explore the delights of the varied southern cookery—each state has something which tradition has consecrated and discriminating palates have approved.

Get acquainted with southern hospitality as it flourishes all along the route; with southern society, even yet showing a lingering trace of all the graces of the old regime; with the charms of the southern women, of which everybody has heard so much. See the evidences of progress and improvement on all sides; the immense posibilities which the varied resources and the still cheap lands of this immense section offer.

And let our southern friends reverse the process and come up here along the Dixie Highway and the other highways of this section to see what we can show them. Modesty compels us to refrain from mentioning what Chicago alone has to offer in the way of interest. Besides, a lot of southerners know it since they come up here to spend their summer vacations—and "we are advertised by our loving friends." So once again "Hurrah for the Dixie Highway!"

Indiana May Get Dixie Highway.

"If Illinois wants any part of the Dixie highway, excepting the stretch between Chicago and Chicago Heights, Iroquois county, in which a miserable stretch of road lies between Momence and Watseka, must be improved before the fall of 1916. Otherwise the route will be carried through northern Indiana."

This statement was made by M. M. Allison, president of the Dixie Highway association. The Momence to Watseka stretch was the bone of contention which nearly disrupted the Chattanooga convention in which the idea of a north and south highway was evolved.

Carl G. Fisher, who first thought of the route, bitterly oposed R. J. Finnegan and W. W. Marr, members of the Illinois commission to the convention appointed by Gov. Dunne, who were victorious is their fight to get the highway to enter Illinois near Danville.

Fisher based his contentions against the Illinois scheme on the bad condition of the Watseka-Momence stretch. Marr and Finnegan pledged their word they would use their influence with voters of Iroquois county to get a bond issue passed that would be sufficient permanently to improve the road before 1917. Nothing beyond dragging has yet been done; hence Allison's statement.

Eliminating Grade Crossings.

Plans submitted by the Lackawanna Railroad for the elimination of two grade crossings in the Wyoming section have been accepted by the Millburn, N. J., township committee. The plans carry out the suggestions made by the township authorities two years ago except as regards the Wyoming avenue crossing. The committee had thought of depressing the tracks, but the railroad favored the erection of a bridge as a more economical and equality advantageous arrangement, which the committee thought was satisfactory. The expense to the railroad of the improvements will reach as high as $70,000, it was stated. No idea was given as to the expense to the township. Features of the railroad plans are that there will not have to be a single change in the present grade of the tracks and also that it will not be necessary to condemn any land in connection with the work. For any damages to abutting property which will arise from the raising of the grade of Wyoming avenue, for instance, will be borne equally by the township and railroad, the agreement provides. The township will not be expected to pay any part of the cost of the erection of bridges. Mr. Johnston, for the railroad, stated that, owing to the lateness of the season, it will not be feasible to start the work this year, but added that it was his belief that work would be started as early in the spring as is possible. The Wyoming avenue and Cypress street bridges will be of concrete. The committee has been working on plans for the abolition of the crossing since 1913.

Good Roads Profit Virginia

By GEORGE P. COLEMAN

State Highway Commissioner

THE FARMERS of Virginia are better situated to assist in this work than any other of the citizens, since the development of the road system of the State means more to them than to any other class of citizens.

When you improve the roads of your community you enhance the value of your farmers and reduce materially the cost of production, you make possible a wider range of productiveness, for in this way you are bringing your markets to your farms. You know that to have a wide awake, prosperous community you must have improved roads and these roads, after construction, must be maintained and properly cared for.

The State Highway Commission was organized in 1906, and is composed of a commissioner, who is appointed by the Governor for a term of six years; the professors of civil engineering of the University of Virginia, Virginia Polytechnic Institute and Virginia Military Institute. The same legislature passed the Withers-Lassiter Law, appropriating $25,000 to establish the State Convict Road Force. Under this law, a county desiring to improve its roads makes application through the county road authorities to the State Highway Commissioner for a force of convicts. In this application they designate the roads which they wish to be improved, and the amount of funds available for the work. I will state here that it is only contemplated under this act that the main traveled highways of a county shall receive State aid. The commissioner, on the part of the State, if the men and funds are available, establishes the camp. These prisoners are furnished to the counties free of cost, that is, the State clothes, feeds and guards them, placing them on the road each day free of cost to the county. The county, on its part, agrees to supply the necessary machinery, tools, teams and free labor for the proper and economical execution of the work. In this way the cost of road construction in the county is about equally divided between the county and the state. In several of the counties of the state, the convict road work is being done by contract, that is, the labor is furnished to the contractor at 10c. per hour and at the end of each month the amount represented by this labor is deducted from his monthly estimate. However, the greater part of this work is being done by the Highway Department and the county acting jointly, for we have found from experience that we can handle the problem more economically this way, building a better class of road at a lower first cost. The work is done under the supervision of an engineer appointed by the Highway Department.

The State Gives Aid.

The legislature of 1908, realizing that there were not a sufficient number of prisoners available to supply the needs of the counties throughout the state, passed what is known as the State Money Aid Law. Under this act counties which cannot obtain convict labor for their road construction, make application to the Highway Commissioner for money aid to be used in the improvement of their main roads and in the construction of their bridges.

In addition to this, the legislature of 1910 passed the automobile bill, placing the licenses received from automobiles in the Money Aid Fund.

This money, that is, the State Money Aid and Automobile Tax, is apportioned to the counties according to the tax on real estate, personal property, income and capitation tax paid into the State treasury by that county during the preceding fiscal year. The county authorities, on their part, obligate themselves to put up an amount equal to that received from the state, and to have the work done in accordance with plans and specifications of the Highway Commissioner, and under the supervision of the Highway Department. No county can, however, receive both convict labor aid and State money aid in one and the same year, and application has to be made for the one desired before the 1st of January.

Counties can raise funds to maintain the convict force, or meet the state money aid, in several different ways: 1st, through direct taxes for road purposes; second, by special acts of the legislature giving to the board of supervisors the right to issue bonds without the vote of the county, and third, by county or district bond issues.

All of you are familiar with the laying of your general tax levies. This, as you know, is done each year by your board of supervisors. A county, however, desiring to issue bonds, can through the majority of its board of supervisors, or upon the petition of 150 freeholders of the county, petition the judge of the circuit court to order an election to be held for that county. This petition must set forth the amount of bonds asked for and designate the roads in the county to be improved, giving their approximate location, length and width. The majority of the qualified voters of the county is required to carry this election. Should a magisterial district of a county desire to issue bonds it may, by a petition to the judge of the circuit court of a majority of the board of supervisors, or 50 freeholders of the district, ask for an election, and upon receipt of this petition the judge shall order an election in that district. A majority vote of the free holders of the district voting is required to carry the election. After this election, the local road authorities shall then make application to the Highway Commissioner for a competent engineer to make plans and specifications for the roads or bridges to be built or improved from the proceeds of the bonds. The work is then advertised for bids, and if satisfactory bids are received, the work is let to the lowest responsible bidder. If not, however, the work is undertaken by the county forces, and is done under the supervision of an engineer agreed upon by the county officials and the Highway Department.

Counties Get Money Back.

When a county, by bond issue or from its general funds, anticipates its State money aid, it is entitled to receive back from the State its annual apportionment until the whole equals 50 per cent of the total expended. This amount will, of course, vary according to the appropriations made by each succeeding legislature. This, then, brings us to the work which is being done by the Highway Department.

The department, as I have said, was organized nine years ago last July. The work of the first two years was given up almost entirely to bringing to the atten-

tion of the people of the various sections of the State, the advantages to be derived from the systematic improvements of their roads, the idea at that time being that the people, once realizing the value of roads to their community, would see that it was carried out successfully. At the end of the first 2 years of missionary work, the demand from the various counties of the State was so urgent and insistent that the state's appropriation for road purposes was increased to $325,000, part for the maintenance of the State convict road force and part to be used in direct money aid to the various counties not receiving convict labor aid. This amount has been increased from year to year, until the appropriations made for the purpose by the legislature for 1915-16 are as follows:

For maintenace of State convict road force, $200,000 and jail fees.

For State Money Aid, $185,000.

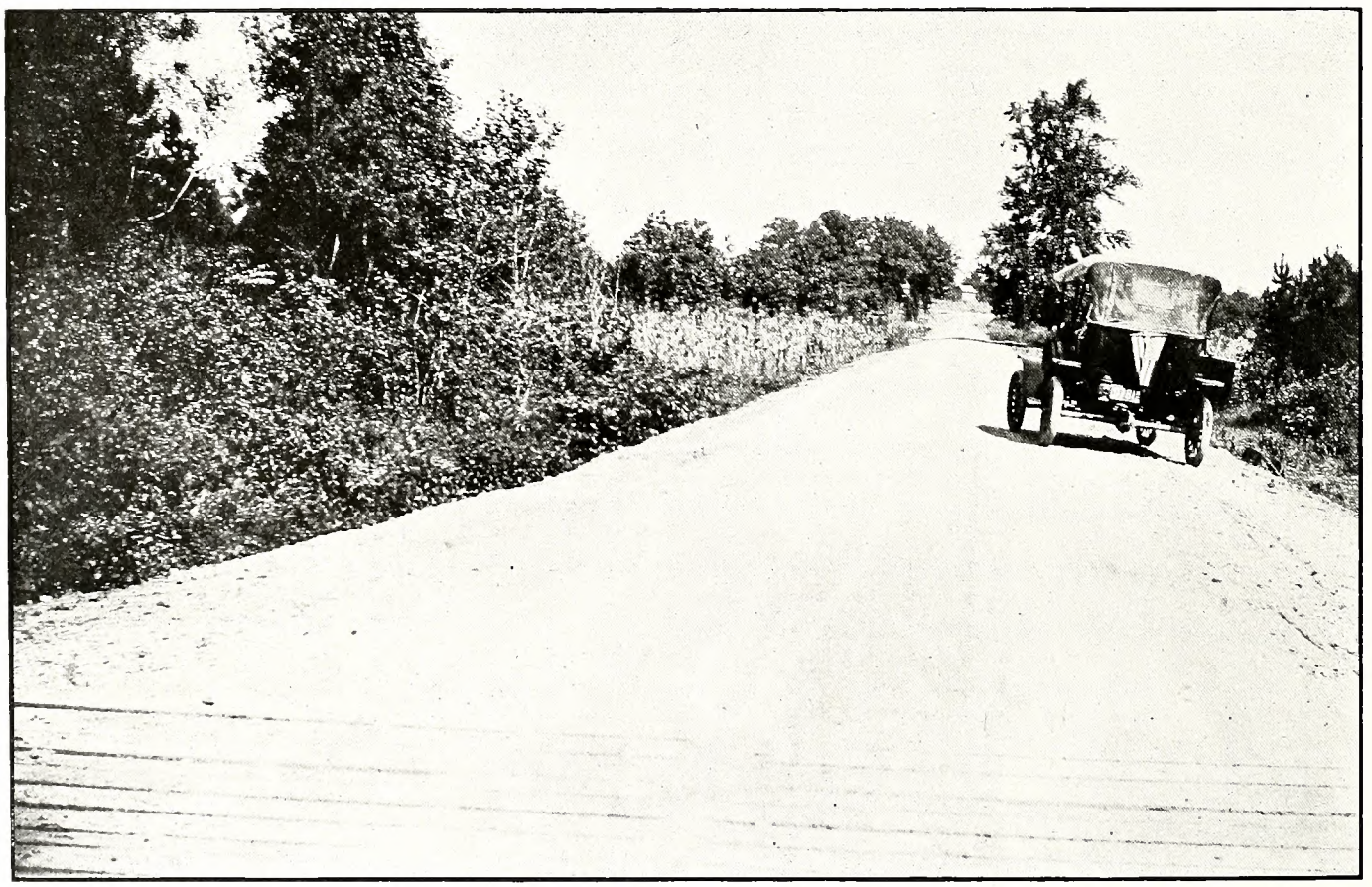
Automobile tax, which is a part of State Money aid, amounting to approximately $130,000.

The Widespread Benefits.

In addition to this, an appropriation of $26,000 was made for the maintenanee of the Highway Department, which has given us a total appropriation from all sources for work during this season of $541,000. During the 12 months beginning October 1, 1913, and ending October 1, 1914, the Highway Commission worked in 96 of the 100 counties of the State. In that time the forces of the State and county were employed on 403 pieces of road work, constructing 855 miles of various classes of road. In addition to this, we had under contract in the same period, 91 bridges, making a total of 494 pieces of work supervised by the engineers of the department. We have at the present time 34 convict camps at work in as many different counties representing approximately 1250 convicts from the State penitentiary, and between 500 and 600 prisoners from the county and city jails, making a total from all sources of from 1750 to 1850 prisoners who are employed by the State on road work. We have on file applications from a number of different counties for additional camps. This labor has cost the State in the last year, approximately 53 cents per 10 hour working day.

In the other sixty-odd counties of the State, we have been working under the State money aid and county district bond issue laws. As stated above, the State has contributed $185,000 from its general fund, and in addition, the automobile law, which makes a total contribution of $315,000. During the last year we expended on road and bridge work throughout the State approximately $1,767,000. So much, then, for the work which has been done during the past 12 months.

Since the organization of the Highway Department and prior to October 1, 1914, the State had appropriated for road and bridge improvement in the various counties, under the convict road law and the State money aid law, approximately $2,300,000. In addition to this, the various counties and districts had voted bonds amounting to $6,675,100. A great many of the counties, however, have made direct appropriations from their county and district road levies to maintain the convict camps and to meet state money aid. Of these various amounts we have expended approximately $551,000 in the construction of highway bridges of varying lengths and types, and have expended $7,328,309 in the construction of roads. With this amount of money we have constructed between 250 and 300 bridges and 2916 miles of road.



Proper Maintenance Under Office of Public Roads, Granville County, N. C.

The average cost of these roads for variable widths are:

Macadam—State Money Aid, $5147.00 per mile. Convict labor, $4459 per mile.

Gravel—State Money Aid, $1455 per mile. Convict labor, $1505.00 per mile.

Soil or sand-clay—State Money Aid $747 per mile. Convict labor, $942 per mile.

We had available on the first of the year, from all sources, approximately $2,000,000.

Property Values Increase.

It is exceedingly difficult to estimate the benefits which the State and you, as its citizens, have derived from the expenditure of these large amounts of money. Some time ago we made an investigation in a number of our counties and found that land values had increased where the roads had been improved from 25 per cent to as much as 100 per cent in value. We estimate that the average increase in land values, throughout the State, due to road improvement, is about 33 1-3 per cent. In a case we investigated, we unearthed some facts which I believe will be of interest to you.

One of our counties in 1909 improved about 40 miles of road at an expenditure of $100,000. Two years after the completion of the work, the railway took away in 12 months from one of the stations 71,000 tons of agricultural and forest produce. Before the improvement of the roads, the highest tonnage for any one year was 49,000 tons; in other words, the quantity of the county's produce had risen more than 45 per cent. The increase shown in dairy products was much more interesting. In 1909 this amounted to 115,000 pounds, and in 1911 they approximated 273,000 lbs., an increase of practically 140 per cent. In the same time the shipment of wheat had increased 59 per cent; tobacco 31 per cent and lumber and other farm produce 48 per cent. In addition to the increase in quantitis, the cost of hauling each ton of produce has been materially reduced. In other words, the farmer not only produces more, but produces more cheaply, for the cost of transportation is, of course, an important factor in the cost of production. From traffic studies made in these 2 years we find that 65,000 tons of outgoing products were hauled an average distance of 8 miles, or a total of 520,000 ton miles. From figures available, the cost of hauling before improvement was 20 cents per ton mile. (I am of the opinion that this is low rather than high,) and after improvement this fell to 12 cents per ton mile, or a saving of 8 cents per ton mile, which amounted to $41,600. From this you will see that the citizens of this county have effected a saving of approximately 41 per cent per annum.

You will see from the foregoing that the large amount of money derived by state appropriation and from the sale of long term county and magisterial district bonds, has been expended in the various counties of the state in the construction of roads and bridges, but that no provision has been made in either the county or magisterial district bond issue laws, or in the general laws of the State for the maintenance and upkeep of these roads after they have been constructed. These changes have been repeatedly recommended by this department, since it has been found exceedingly difficult to impress on the local county road authorities the necessity of the maintenance of the roads as they are constructed. I cannot, therefore, urge too strongly the importance of immediate legislation requiring the counties to make proper provision for the upkeep of their roads. For it is certainly most unwise and unbusinesslike to sell long term bonds for this purpose and made no provision for maintenance. For under the existing laws many of our counties are issuing these long term bonds for road construction, after which the roads are left to take care of themselves, and in a few years the only thing which the county will have to show for it will be the debt. In other words, unless the roads are properly maintained and cared for they will not last half the life of the bonds which have been issued for their construction. I cannot, therefore, urge too strongly the agitation of this most important question in order that the citizens of the counties and the State as a whole may be fully advised in the matter and instruct their representatives to the next general assembly to see that the necessary laws are passed to remedy these defects. With this end in view, the Highway Department is preparing several bills covering the mode for raising the necessary funds for the maintenance of these roads.

We will ask the legislature to amend both the county and bond issue law and the magisterial district bond issue law, requiring the board of supervisors of a county or district where bonds have been issued for the construction of roads or bridges, to lay a levy of not less than 3 per cent of the amount of the bonds issued for the maintenance of the roads or bridges which have been constructed from the proceeds of the sale of the bonds. In addition to this, we will ask the legislature to set aside the automobile tax, which now goes into the State Money aid fund for new road and bridge construction, into a fund for the maintenance and upkeep of the roads which have already been constructed under State supervision, this money to be met by a like amount from county revenues to be distributed to the counties according to the cost and length of the roads constructed, the work to be done, where possible, by the county road forces, according to the plans and under the direction of the State Highway Department.

Punish The Highway Speeders.

The county officers of San Jose, California, are planning to make the life of the speeder on the public highway a little harder than it has been. District Attorney Free has given the three traffic officers instructions to report all cases of fast driving to him. When a man is caught running too fast he is warned and a list of those given warning is put in the hands of the proper officials. Should the offender repeat his offense the evidence of his first warning is put in the hand of the magistrate and punishment is meted out accordingly. The great increase in tourist traffic at that place necessitated the appointment of four county traffic officers, each of which is given a specific allotment of territory.

Indiana Leads in Roads.

With a total mileage of 24,995 miles of improved roads, Indiana leads the Union, with Ohio a close second, with 24, 106 miles to her credit. New York is third with 12,778; Wisconsin fourth with 10,167; Kentucky fifth with, 10,115; Illinois sixth with 8,915; California seventh with 8,587. Nebraska is credited with only 248 miles of improved highways out of a total mileage of 80,338, while North Dakota drops still lower with only 140 miles from a total of 61,593. The New England States lead all sections of the country in public road improvement, 22.2 per cent having been improved upon.

The Highway Situation in Kentucky

By JAMES MARET

President "Boone Way," Mt. Vernon, Kentucky

ONE HUNDRED AND FOUR, out of 120 counties in Kentueky, have taken advantage of the State aid road law, enaeted in the year 1914 and are actively at work, or soon will be, in the construction of new inter-county seat highways or the reconstruction or improving existing turnpikes. Southeastern Kentucky, as well as the other mountainous section of the eastern portion of the state has plodded with nothing mueh better than "trails" since Boone passed this way a hundred and forty years ago.

The most important through highway proposition, to the people of Kentueky, Tennessee, North Carolina, at this time, is "Boone Way," now being constructed from Cumberland Gap northward to connect with the Kentucky system of turnpikes. This road has been routed from Cumberland Gap to Louisville, across the state, a distance of 250 miles via Middlesboro, Pineville, Barbourville, Corbin, London, Mt. Vernon, Crab Orchard, Stanford, Lancaster, Danville, Harrodsburg, Lawrenceburg, (west loop), Nicholasville, Lexington, Versailles, Frankfort, Shelbyville, thence to Louisville.

There is a turnpike from Crab Orchard to Louisville, a distance of 155 miles, which is being improved by every county through which this highway passes, leaving 95 miles to be made between Crab Orchard, and Cumberland Gap. This construction now under way, is expected to be completed by August 1916.

The east loop of Dixie Highway, that portion between Chattanooga and Indianapolis, will use 85 miles of the road bed of Boone Way, (Dixie-Boone), between Cumberland Gap and Mt. Vernon, Kentucky, where it diverges for Richmond, Lexington, Cincinnati and Indianapolis. W. J. Sparks, of Mt. Vernon, is president and James Maret, of that plaee, is secretary of the East Kentucky-Tennessee Dixie Highway Association, an auxiliary to the parent organization, with duties of looking after and encouraging the early completion of the work on this division or Eastern loop of this great highway between Chattanooga and Indianapolis. Most good roads readers recall the faet that the Dixie Highway (with loops) is routed from Chicago to Miami, Florida, the west loop diverges at Indianapolis going via Louisville, and Nashville to Chattanooga, where it converges with the eastern loop.

Yet another route has been loeated and named the Dixie Bee Line. Starting from Chicago, going via Evansville, Indiana, and entering Kentucky at Henderson, thence via Hopkinsville and Guthrie to Nashville.

The Jackson Highway lately put on the map, is another important movement. Peter Lee Atherton, a great Highway man, of Louisville, was eleeted president of this association at its recent convention at Nashville. The routing of this highway is about as follows: One branch beginning at Chicago going via Indianapolis to Louisville, the other starting at Buffalo or Niagara Falls; thence across the western portion of New York, Pennsylvania, across Ohio and entering the state of Kentucky at Maysville, thenee via Lexington, and from that point will go over the roadbed of Boone Way (Boone-Jaekson) through Frankfort to Louisville

where it converges with the Chicago division; thence to New Orleans via Bardstown, Glassgow and Scottsville, Kentucky to Nashville, Birmingham, Montgomery and Mobile on to the Crescent City.

Eastern Kentucky counties are working on a proposition to build a highway from Whitesburg, Letcher county, lying on the border of Virginia, to Richmond, Kentucky, through the counties of Letcher, Leslie, Perry, Breathitt, Lee and Estill, there to connect with the Dixie Highway. It is proposed to name this road the "McCreary Highway," in honor of our Governor, who has been a consistent friend and worker in the good roads movement.

Kentucky has got into the good roads game for keeps, as is evidenced by the fact that 104 of her counties have applied for state aid and gone to work. It is to be recalled that the legislature, in 1914, passed a road law which allows any county in the state to draw from the state treasury an amount equal to that expended by said county upon the construction of new roads or the reconstruction of old ones. The first ones, however, which must receive attention shall be inter-county seat roads. Where a county appropriates and uses $100,000 upon the roads, in accordance to statutes, the state repays $50,000 in yearly payments until that amount has been refunded to the county. Along with this bill was a provision levying five cents upon all property throughout the state, which fund is placed in the treasury for meeting these payments. Under this law there has been the greatest awakening on this highway subject that ever took place in the old commonwealth.

A large number of counties have voted bond issues. Others are following almost daily. But few counties have turned down the proposition. The latest to carry was Fayette county, which has the best system of pikes in the state, yet voted a $300,000 bond issue to further improve its splendid highways.

Bonds and appropriations to the amount of $1,850,000 have been voted and made by the counties through which Boone Way and East Dixie Highway passes in Kentucky for the construction of these and local roads.

It is proposed, during 1916, to route Boone Way on southeast from Cumberland Gap to Mocksville, North Carolina, the old home of Daniel Boone, who left that point on his memorable march in 1775 for Kentucky, guiding the Hendersons to Boonesboro. The route will probably be about as follows: Via Bristol (Va-Tenn.) Elizabethton, Tennessee, Elk Park, Avery county, North Carolina to Linville; thence over the "Crest of Blue Ridge Highway," (Boone-Crest) to Blowing Rock; thence over the Bristol-Charlotte Highway through Patterson, Lenoir, Hickory, Newton and Statesville to Mocksville, with a branch or loop from Linville to Asheville and Biltmore, over Crest of Blue Ridge Highway; thence through Oldfort, Marion, Bridgewater, Morganton, and Connelly Springs to Hickory, there to converge with eastern loop for Mocksville. A spur is also proposed from Blowing Rock to Boone, in Watanga county, North Carolina. The distance from Louisville to Mocksville 500 miles. Cumberland Gap being the exact half way point.

The year 1915 still has almost three months to its credit, but, in the progress made in its first three quarters, it has more to its credit of substantial achievement for Kentucky's immediate and lasting betterment than any decade of years in the last half century.

France has 25,000 miles of the finest roads known and more than twice that many highways of secondary class. The percentage of improved roads is higher in that country than any other in the world.

SOUTHERN GOOD ROADS
A MONTHLY MAGAZINE
DEVOTED TO HIGHWAY AND STREET IMPROVEMENT

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FALL ROAD WORK IN PREPARATION FOR WINTER RAINS.

Winter in the Southern states is accompanied by prolonged rainy spells that play havoc with earth and sand-clay roads. The time to prepare for the winter months is now when the weather is good and road crews are well organized and running smoothly.

A few words as to the work to be undertaken:

Above all things avoid disturbing a hard and well completed surface.

In using a road grader do not pile too thick a covering of the earth over the old road surface.Spread the earth thinly so that it will have an opportunity to pack before the heavy rains come.

Fill all the holes and deep ruts with material from the side of the road—not from the ditch unless the ditch workings are unusually good. Put in enough material to allow for settlement.

Dig all rocks out of the road and fill the holes made with new material from the roadside. Do not pick in the holes around the edges and leave it. A depression will develop that will hold water.

Cut the weeds before they go to seed, especially around the ends of culverts.

See that ditches draining cuts do not empty along adjoining fills. Cut a ditch outlet at an angle with the road.

Put some sort of water breaks in the ditches on long hills. It is more economical to keep the earth where it is than to put it back again after it washes away.

See that all culverts are free and the outlet ditches open. If there is danger of washing at the lower end of a culvert put rocks or poles there, or better still build a drop that will provide a water cushion.

On clay roads haul sand to places where you think the road will become very muddy and pile it along the roadside. It can be spread by hand when the road gets muddy.

Replace the bad places in wooden culverts and throw some extra material along the end planks.

Build guard rails along narrow and dangerous fills.

In districts that will be remote from the road crews during the winter months make contracts with reliable men to drag certain roads after rainy spells at a fixed sum per mile for each dragging and have them report on postcards whenever they do any work. Provide them with drags now.

Get the jump on the mud by dragging in the heavy ruts and allowing them to pack smooth before the heavy rains come.

THE BOONE HIGHWAY NEXT.

Early in the coming year it is planned by President James Maret, of the Boone Way Association, to route the Boone Highway from Cumberland Gap, Kentucky, to its termination in North Carolina. Davidson county, in this state, lays claim to being the home of Daniel Boone when his father first brought the lad from Pennsylvania to the banks of the Yadkin, where history says he settled. Overhanging the winding waters of this stream, upon an eminence that would have given the early pioneer an outlook of many miles on either side of the river, has been built to his memory a cabin supposed to be nearly an exact replica of the one in his father's yard, where he took Rebecca Bryan, his bride. The Daniel Boone Memorial Association, chartered by the North Carolina legislature, erected this memorial several years ago and other historical bodies have since contributed other markers.

From the Yadkin territory Boone is said by history and tradition, as nearly authentic as can be found, to have gone to Kentucky to guide the Henderson expedition to their new home in the blue grass. It was on this trip that he marked the trail that is proposed to be followed by this great road. Colonel Theodore Roosevelt once went over this mountain trail and interviewed the older citizens along the way and he was convinced that the traditions of the mountain people left little doubt as to its true location.

The road from Louisville, Kentucky, to Cumberland Gap is now provided for and a number of counties in Tennessee and North Carolina have built links that will likely be coupled up when the last half of the route is determined. Among these is Avery county, in the heart of the mountains, which has made available $150,000, a part of which will likely build one of the most difficult stretches. Other counties east of Avery have

already done much toward the highway that will penetrate the mountain country. In the sections at the foot of the mountains no trouble will be encountered as all these counties are good roads counties.

The building of this road would mean much to the entire South and in particular to the Southern Appalachian country. It would open this section to the motorist of North, East, West and South. In Kentucky it would join the Jackson Highway and the Dixie Highway, while in North Carolina it would effect a junction with the National Highway. A route for tourists probably unexcelled in the United States or the world would be at the call of the motoring world and a pathway to the outside country would be available to many thousands of the mountain people who have been cursed for a hundred and fifty years by isolation. To these it would be worth many times over every cent that it would cost. Some of these sections cannot be reached by railroad for many years, if ever, but motor lines would bring them far away from the rear of the march of progress.

North Carolina's claim on Boone has been recognized by the appointment of H. B. Varner, of Lexington, as state vice-president, and Davidson county is represented by the naming of J. R. McCrary, of Lexington, as commissioner for that county.

A GREAT EASTERN PLAYGROUND.

The action of the Southern Appalachian Good Roads Association in asking for ten million dollars more for purchase of additional forest reserves in the Appalachians, coupled with their plan for a great Maine to Louisiana road through that section and a system of roads knitting together this great eastern national park of the future, was a move fraught with much significance for the people of the mountain sections of the nine states represented. And it would be not only these, but the people of the East, Middle West and South who would reap the benefits. It would give the mountain people a mode of transportation for their products and people, the lack of which has kept them decades to the rear of the position in which their native ability would have placed them in more fortunate locations. Every line of industry would move forward in that section and millions would be added to the nation's wealth. A section that holds much of the beauty and health-giving atmosphere of the country would become more easily available. These tourists would bring millions to the hills of Appalachia and take back to their homes the vitality worth many more millions to them and their communities. The plan is a big one, and it is to be hoped that what has long been a dream will within a few years become a reality even beyond the dream.

An election for the first Monday in December has been called for Stewart County, Tenn., to vote on bonds for a proposed system of 145 miles of good roads. $200,000 is the estimated cost.

Convict Labor No. Experiment.

"The use of convicts on the public roads has passed through the period of hysterical wrangle into a period of actually successful accomplishment and almost universal acceptation," states E. Stagg Whitin, whose new course in practical penal problems at Columbia University was recently announced.

Dr. Whitin holds that the underlying motive in convict road building must be to secure the great efficiency for the state out of its possessions. Both the convicts and the roads are property of the state, and the working of convicts upon the roads should eliminate many elements of waste in the administration of road and prison departments.

"The efficiency of the convict on the road gang," he continued, "differs greatly in different gangs. There is no doubt in my mind that the application of the efficiency records in use at the present time in the Wisconsin road camps for free labor will tend even more perceptibly to raise the efficiency of convict labor.

"Incentive must be created before good work can be produced. Coop any of us up in a stuffy, unsanitary jail for several months, arraign us for trial amid the excitement of what we misname as justice, and then take a few months of breaking our spirit in prison surroundings and there is little likelihood that the thing we call ginger will be very apparent. There is definite need of building up if the convict is to return to society and make good.

"The great need," Dr. Whitin concluded, "is for the foreman of a convict road gang to throw his shoulder to the task and inspire his gang with the desire to be like him. The problem lies in securing such men as foreman of the road gangs."

The graduate department of highway engineering at Columbia University has been in close touch with the National Committee on Prisons and Prison Labor, which is located on the campus, for a number of years. This work has been carried on under the joint direction of the department and the prison committee. Dr. Blanchard, professor of highway engineering, sees the great opportunity for the highway engineer in developing convict road work, and, as he stated in a recent article in the Columbia Spectator: "the humane element must be a factor in the education of the highway engineer of the future." This will be supplied through the co-operation of the National Committee on Prisons and Prison Labor and the work under Dr. Whitin at Columbia University.

Four days of the past month, October 19th and 20th and 26th and 27th, were devoted to co-operative volunteer work on the Jeff Davis Highway, which will traverse the length of the state of Kentucky as a memorial to the great Confederate leader and president furnished by that state. The counties of Trigg, Marshall and McCracken had appointed a leader for each mile of the road through these counties and volunteers were solicited among the citizens of the route. The women of this section are taking a most active part and barbecues are being made a feature of the work. An effort is being made to have the Kentucky Daughters of the Confederacy boost the movement throughout the commonwealth. The highway will pass the Jeff Davis home, for which the Daughters have already provided $1,000, and their organization expects also to provide the markers for the road. During the coming winter the greater part of the road is expected to be finished and ready for the spring and summer tourist traffic of next year.

Cheap Concrete Bridge in Tennessee.

Knox county, Tennessee, claims the distinction of having the cheapest concrete bridge of its kind yet heard from. The sixty-five foot concrete arch over Flat Creek, at Mascot, was constructed at a cost of only $2,000. Engineer R. O. Gallagher reports that the material used in construction of this bridge is a biproduct of the American Zinc Co., and is known locally as Mascot chatz. This substance is being used extensively by Knox county road builders and all the wooden bridges are being torn away and replaced by this economical and substantial material. The bridge replaced here was a steel structure that had been in use for thirty years or more. Part of the masonry from the old bridge is seen at one end of the concrete work of the new arch. Forty-three concrete bridges have been built in Knox county during the past twelve months. The road commission went into office in 1914.

In speaking of the progress of the work during the past twelve months, Engineer Gallagher says: "The Knox county workhouse under their supervision has built 24 miles of macadam roads in the past twelve months. This workhouse is in two divisions and are equipped with crushing outfit complete and use motor trucks for delivery of materials to the roads.

"Knox county has about 400 miles of macadam roads—perhaps more than any other county in Tennessee. If allowed to continue for a few years longer we expect to claim the distinction of having no wooden bridges on the pikes of Knox county. Wooden bridges are an expensive nuisance. The concrete bridge shown in the photo is in place of an old steel bridge, which had been there for about 30 years; a part of the old masonry can be seen on one end. We do not believe this bridge could be duplicated anywhere for the cost, $2,000."

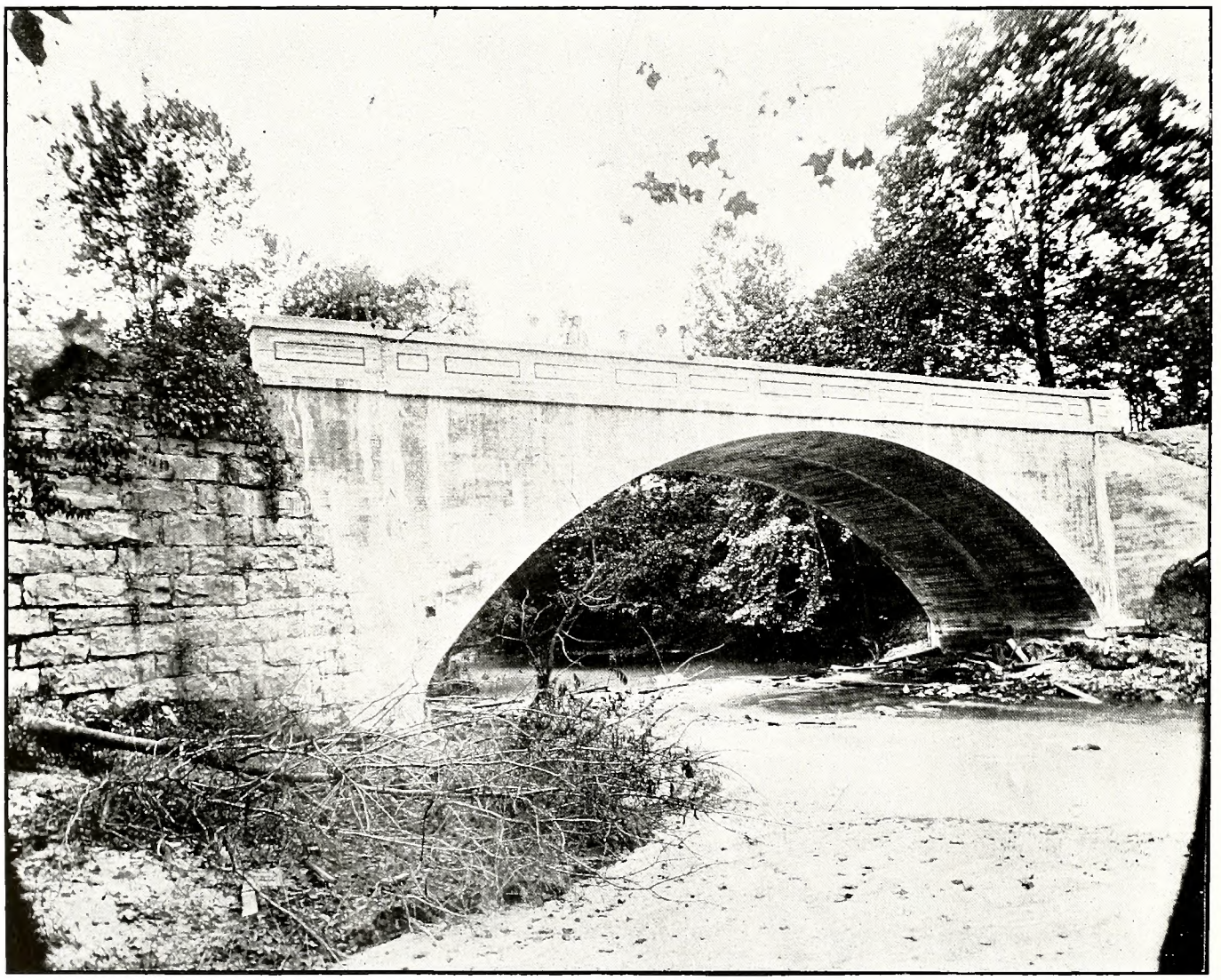
Highway Markers.

Peter Lee Atherton, President Jackson Highway Association, Louisville, in correspondence with President James Maret of Boone Way Association, says:

"So far as I can see at this time—there will be no contest for the location of the Jackson Highway between here and Lexington and I can see no possible objection to to the Boone Way and Jackson Highway using the same road, the marking for one road could be put on one side and for the other on the other side. We will all work together to make the road as good as possible for everybody who goes over it."

Special trains will be run to Evansville, Ill., for a meeting of enthusiasts for the Dixie Bee Line route, which will be held November 4.

Harris county, Texas, has set aside $200,000 for immediate road work.



65 Foot Arch Over Flat Creek at Mascot, Tenn., Built in August, 1915 by Knox County Road Commission at Cost of Only $2,000

Alabama Good Roads Association

By J. A. ROUNTREE, Secretary

THE Nineteenth Annual Session of the Alabama Good Roads Association convened in Birmingham on Oct. 12th-13th. There were over 500 regularly and constituted delegates that registered representing forty-eight counties in Alabama. There were several hundred visitors and those interested in good roads in attendance.

Hon. John Craft, president of the association, presided over the meeting. Secretary J. A. Rountree, who is one of the founders and the first secretary of the organization, made his nineteenth report of the organization. He stated that thirty-six county organizations and fourteen branch organizations had been organized during the past year. He told of the work that had been done in connection with the Dixie Highway, the Forrest Highway and Jackson Highway. More than 10,000 letters and 20,000 pieces of literature were sent out by the association in its effort to work up good roads interest during the last twelve months. He also told in detail of the observance of Good Roads Days, August 14th and 15th, and reported that the Alabama legislature recognizing the great benefits that had been accomplished by observing Good Roads Days, had officially designated these days as holidays. He also showed the great work the association had done in trying to secure good roads legislation. He closed his report by saying "more work had been accomplished and more good derived during the last twelve months through the efforts of the association than even in the history of the good roads movement in Alabama."

The convention was composed of the leading good roads advocates, officials and engineers throughout the state. Among the distinguished men that were in attendance and took part in the proceedings were: United States Senator John H. Bankhead, Ex-United States Senator Frank S. White, Congressmen Jno. L. Burnett of Seventh District; E. B. Almon of Eighth District; Fred L. Blackmon of Fourth District; W. B. Oliver of Sixth District; Messrs. John Craft, J. B. Rylance, G. N. Miteham of the State Highway Commission. Able and entertaining addresses were delivered by the above named gentlemen.

One of the most interesting features of the convention was the cabaret entertainment at the Birmingham Newspaper Club, together with stereopticon views of brick, cement, clay and asphalt roads and culvert draining. Representatives of all these interests appeared with splendid pictures and explained them to the delegates. Mr. Geo. H. Clark, Jefferson County Road Engineer, showed forty odd views of the splendid roads in and around Birmingham. His talk on convict built roads was very interesting and many of the pictures that he showed were built by this labor.

The three most important things accomplished by the convention was the adoption of a resolution favoring state and county convicts upon the public roads of the state; recommending that the state of Alabama issue $50,000,000 in bonds to build good roads; recommending that if postage is reduced to one cent that half of the funds that is derived from the same shall be used as a nucleus for the construction of a system of post roads throughout the United States.

The association went on record as agreeing to affiliate with the National Highway Association, the United States Good Roads Association, and authorizing the association to send representatives to all national organizations that have for their object the building and maintenance of roads. The association agreed to affiliate with all reputable national bodies, but refused to amalgamate with any of the national organizations.

Hon. John Craft, of Mobile, was re-elected president of the association for the eight time. J. A. Rountree was re-elected for the twentieth time as secretary of the organization. The following is a list of the officers and members of the Executive Committee.

John Craft, Mobile, president; John W. O'Neill, 1st vice-president, Birmingham; J. E. Pierce, Huntsville, 2nd vice-president; Senator John H. Bankhead, 3rd vice-president; Senator Oscar Underwood, 4th vice-president; J. A. Rountree, secretary.

District Vice Presidents.

1st—J. B. Blech, Mobile; 2nd—E. M. Lovelace, Brewton; 3rd—G. P. Butler, Opelika; 4th—E. B. Beason, Clanton; 5th—C. E. Thomas, Prattville; 6th—W. W. Odgen, Sulligent; 7th—Gardner Green, Pell City; 8th—Wm. E. Skeggs, Decatur; 9th—L. H. Pennington, Birmingham; 10th—W. C. Davis, Jasper.

Executive Committee—State at Large.

Hugh McGeever, Birmingham; Governor Charles Henderson, Montgomery; Lieut. Governor Thos. E. Kilby, Anniston; J. F. Kelton, Oneonta; J. M. Friedman, Mobile; Frank S. White, Birmingham; N. K. Wilner, Birmingham; J. W. Shepherd, Jasper; R. P. Nobson, Greensboro; Clarendon Davis, Huntsville; W. E. Waters, Alexander City.

Executive Committee by Districts.

1st—J. K. Kyser, Burnt Corn, W. H. Holcombe, Mobile; 2nd—P. J. Cooney, Foley, Horace Hood, Montgomery; 3rd—G. N. Mitcham, Auburn, D. G. Turnipseed, Union Springs; 4th J. B. Ellis, Selma, F. A. Gulledge, Verbon; 5th—J. W. Overton, Wedowee, J. A. Wilkerson, Autaugaville; 6th—W. D. Seed, Tuscaloosa, W. F. Fitts, Tuscaloosa; 7th—L. L. Herzberg, Gadsden, W. T. Brown, Ragland; 8th—G. A. Nelson, New Decatur, R. E. Pettus, Huntsville; 9th Daniel Greene, Birmingham, Job Going, Birmingham; 10th—W. C. Sparkman, Carrollton, E. P. Goodwin, Fayette.

United States Senator Frank S. White was chairman resolution committee and made the following report:

We, the Committee on Resolutions appointed by the Alabama Good Roads Association, after proper consideration of the resolutions referred to it, and after due consideration thereof, report favorably the following resolutions, and recommend their adoption by the convention:

No. 1.

Whereas, There is an organized effort to reduce first class postage from two cents to one cent; and,

Whereas, the gross receipts to the postoffice department, of first-class mail, is estimated to be seventy-six million dollars per annum, and if reduced to one cent, it would curtail the revenues of the government to the extent of about thirty-six million dollars, and will inure to the benefit of a few and not to the masses; and,

Whereas, the mail and parcels post is largely delivered and collected over the public roads of the state;

Now, Therefore, Be it Resolved, That we favor the retention of two-cent postage for first-class mail matter, as a nucleus around which to build the fund for federal aid in the construction of a system of post roads and appropriating or setting apart, for this purpose, of this difference of one cent or of thirty-six million dollars.

Resolved, That it is the sense of this convention that the state and county convicts be taken from the mines, lumber camps, and other places where they are being worked under lease of hire, and worked upon the public highways.

Resolved, That it is the sense of this meeting that, in the future, the program be fixed so as to give a discussion of practical road building laws requiring the building of roads, and all matter of a political or advertising nature be disallowed, except upon special action of the convention.

Resolved, That this association recommend the authorization of an issue of fifty million dollars, at the rate of one million per annum, of the bonds in the state, or so much thereof as may be necessary to be issued, in annual installments, as the money can be profitably and economically expended in the building of roads in the state.

Resolved, That this association affiliate with the United States Good Roads Association and send representatives to all national highway bodies that it sees proper that have for their object the building of good roads.

Resolved, That the thanks of this association be tendered to Hon. W. H. Key, of Franklin, for introducing and securing the passage of the bill designating Good Roads Days, Aug. 14th and 15th.

Resolved, Further, That we urge the people of Alabama to observe these days and thereby arouse as much enthusiasm as possible in the subject of good roads.

Resolved, That the association express its thanks to the Jefferson County Association and its committees for their faithful service in our entertainment.

Resolved, Further, That the thanks of the association be extended to the Chamber of Commerce of the City of Birmingham for its generosity in extending to us the use of its hall for our meetings, and for many other courtesies extended during the session of the convention.

Resolved, Further, That the grateful thanks of the association be and the same are hereby extended to the speakers on the program, as well as to others who spoke during sessions of the convention.

It is Further Resolved, That the thanks of the association be extended to the press of the city for the generous notices published by them of the meetings of the association.

Statement of the Ownership, Management, Circulation, Etc., Required by the Act of August 24, 1912,

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Gerald Johnson, Greensboro, N. C.

Fred O. Sink, Lexington, N. C.

FRED O. SINK, Secretary & Treasurer.

Sworn to and subscribed before me, this 27th day of Oct. 1915. W. H. MENDENHALL, Notary Public.

Convicts on Ohio State Roads.

Ohio's new law providing for the working of state and county prisoners upon the public roads went into effect last month. The law was drafted after conference in New York between representatives of the National Committee on Prisoners and Prison Labor and the Commission to revise the road laws of Ohio.

Provision is made for the prison authorities to retain control over the discipline of the prisoners and the regulation of the road camps. The Highway authorities have full control over the road work and pay the prison authorities a sum sufficient to cover the cost of transportation, maintenance and discipline of the prisoners, which may include an equitable portion of the overhead charges of the institution in which the prisoners are confined. The highway authorities also pay the amount credited to the prisoners for their work upon the roads. The guards, if there are any, are chosen by the prison authorities but must as far as possible be competent to supervise the construction work.

The same provisions are to be observed when county commissioners work county prisoners upon the roads, while prisoners unable to furnish bond may, upon request, labor upon the roads.

The highway authorities are to present to the prison authorities before Sept. 1 each year an estimate of the amount and kind of material and supplies that can be used in connection with the construction and repair of the state and county highways during the coming year. Ohio has found the manufacture of pavement blocks a profitable prison industry. By April 1915, two million of these blocks had been finished at the prison plant, the blocks being as fine as any ever used on the roads of the state. The manufacture of road material will afford ample employment during the winter to those prisoners used on the roads during good weather.

The county authorities in Ohio are enthusiastic in regard to the new law as it will help to rid the counties of the "bum element." Under the old system each year the county authorities were obliged to meet deficit to cover the cost of operating the workhouse. The commissioners now feel that the "bum" can be made to work for his keep.

Road work for state prisoners is not a new departure in Ohio, an average of approximately 300 state prisoners having been worked on the roads during the last few years. These men have worked under the honor system and Warden Thomas reports that in one camp of from seventeen to twenty men, twelve were life-termers, yet there was no attempt at escape. The new co-ordination between the highway and prison departments will make possible a much wider development of the work, and place it on a basis fair to all parties interested.

Ohio has centralized the control of its state institutions under the State Board of Administration which board is successfully organizing the prison industries along the state use lines. The National Committee on Prisons and Prison Labor hopes to see the county workhouses and jails drawn under this board within the next few years. When this complete centralization is effected the manufacture of supplies for state and county institutions and the road work will furnish ample industrial opportunity for every Ohio convict. The passage of the new road law is a step towards this end and Ohio is to be congratulated.

GOOD ROADS NOTES
GATHERED HERE and THERE

Florida.

County.	Value of bonds recently voted.	Value of bond issues pending.
Clay	$150,000	.....
Columbia	.....	$350,000
Dade	.....	275,000
De Soto	760,000	.....
Hernando	150,000	.....
Lafayette	.....	300,000
Lake	500,000	.....
Lee	177,000	125,000
Leon	200,000	.....
Orange	600,000	.....
Palm Beach	800,000	.....
Pinellas	.....	715,000
Pasco	258,500	.....
Polk	.....	1,000,000
Putnam	233,000	.....
Seminole	450,000	.....
St. Lucie	60,000	.....
Taylor	.....	500,000
	$4,328,500	$3,165,000

Within a year, Florida counties, acting as separate units, have voted in highway bonds $4,328,500, and there are pending isues which will total $3,165,000. The combined bonds already voted, most of them already sold, and those to be voted on within the next few months will total nearly $8,000,000. Other counties discussing at the present the necessity of floating highway bonds are expected to vote on such issues and bring the total up to the neighborhood of $10,000,000.

Florida has never been so interested in good-road construction as during the last six months. The good-roads movement was started on a large scale three years ago, when Hillsborough county voted an issue of highway bonds of $1,000,000. This was the largest road bond issue ever voted in the state, and was the signal for a revival of interest in good roads. From then until six months ago there was a scattering issue of such bonds throughout the State, but early in the year counties began agitation for highway bonds, with the result that there have been authorized the issuance of nearly $5,000,000 in such bonds since January 1.

Included in the table are neither the Hillsborough county $1,000,000 issue nor the State fund of $2,000,000, a great part of which already has been spent.

* * *

Georgia.

The Georgia Association of County Road Commissioners will hold its second annual convention in Atlanta, November 17-18, according to the announcement of the Atlanta convention bureau. W. Tom Winn, chairman of the committee on public works of the Fulton county commissioners, is president of the association.

The 600 members of the association, whose membership comprises county commissioners, county highway engineers, county wardens and other road building officials, will be entertained with auto trips over Fulton and neighboring counties, where excellent pieces of road work are under construction, and will also be given the freedom of the many attractions of Harvest Festival week. It is believed that a large number of delegates will attend the two days' sessions since railroad rates will be very low.

A luncheon will be given them on November 17, in the Chamber of Commerce building, for which occasion a very interesting program is being arranged. Among those who will speak are R. D. Kneale, professor at Georgia Tech; C. M. Strahan professor at the University of Georgia, and S. W. McCallie, state geologist. The commissioners, in their discussions, will also take up the proposed creation of a state highway commission by the legislature, development in which many are interested.

The officers of the association are Mr. Winn, president; John A. Smith, Hall county first vice president; T. H. Adams, Polk county, second vice president, and Fred Houser, secretary.

* * *

Illinois.

A new method of road building which has been in use at Paris, Ill., for a year and has proved satisfactory, is being tested out at Alton in the piece of brick road that has been built just over the line on the extension of State street to connect with the rock road in Godfrey township. The new stretch of brick paving, paid for by the Good Roads Committee of the Board of Trade, Godfrey township and the city of Alton, is laid under new plans. The rock, dry sand and dry cement are mixed and laid on the ground and then, when laid, are thoroughly wet. While the cement and sand are still wet the brick are laid on top of them without any intervening cushion of sand. The cost of doing the work in this way is greatly reduced and the results are said to be highly satisfactory.

* * *

Tennessee.

It will be good news to the advocates of the Memphis-to-Bristol Highway to know that the interest in this highway project is being revived and that within a short time efforts will be put forward to complete it. Charles C. Gilbert, secretary of the Memphis-to-Bristol Highway Association, was recently in Memphis conferring with C. C. Hanson, chairman of the western division of the commission, with regard to calling a meeting of the commission and making an inspection of the highway from Memphis to Nashville.

The Tennessee Highway Commission has expressed a desire to render every assistance possible toward coupling up the various links of the highway and, at as early a date as possible, to run it over to the people of the state. Mr. Hanson will invite the state commission to meet with the Memphis-to-Bristol Highway Commission and both commissions will go over the route of the highway and endeavor to arouse sufficient enthusiasm among the people to have every gap filled in and the highway completed as originally intended.

The Memphis-to-Bristol Highway, as originally selected by the commission, passes through 24 counties and touches 72 towns. At the present time there is a first-class road through 20 of the 24 counties. Provisions have been made for one other county, leaving on-

ly three counties yet to provide means of constructing their links.

The State Highway Commission has drafted a tentative plan of constructing a connecting highway from county seat to county seat, and in rendering assistance toward the completion of the Memphis-to-Bristol highway it would mean that 24 county seats would be connected in one continuous highway.

Secretary Gilbert is to confer with the State Highway Commission and ascertain what date will be most agreeable to them to make a tour of the highway, and then Mr. Hanson will call his commission to meet in Memphis, starting the tour from this city, and follow the route of the highway to Nashville, passing through Brownsville, Jackson, Huntingdon, Camden, Waverly and Dickson. Meetings will be held in each of those towns for the purpose of working up additional interest in the early completion of the trans-state highway.

* * *

West Virginia.

Mr. Cecil A. Robinson, of Wheeling, in speaking to the national pike to Cumberland, Md., says there are less than 15 miles along the entire route, which is a distance of 131 miles, which is not thoroughly modernized. Part of this being from the foot of the hill at West Alexander to Claysville, but by the end of the week it is expected that the work will be completed on Coon Island hill. From Coon Island hill east the work is progressing rapidly, and before winter sets in it is more than likely the road will be finished from Coon Island hill to Claysville. The work is completed east of Washington, with the exception of one gap of four miles between Uniontown and Centerville. Between Brownsville and Uniontown there is a gap of 11 miles, from the 76 mile post to the 87 mile post, 5 miles of which is finished, and two big gangs of workmen are working hard and fast to complete the rest. Through Maryland, says Mr. Robinson, the roads are excellent and show signs of continuous improvement.

Clarksburg good roads enthusiasts are working busily on a plan to build a road that can be used the year around from Clarksburg to Charleston, the capital of the state. The new road, as planned, would go from Clarksburg by way of Weston, and from the Lewis county seat by the old Sutton pike to Bull Town, Salt Lick bridge, Flatwoods, Sutton, over Powell's and Birch mountains to Summersville. From Summerville to Gauley Bridge, to Cotton Hill, to Fayetteville and Charleston. The road would be approximately 125 miles long. The State Automobile association is co-operating in every way possible with the movement.

Much Mud on Dixie Highway.

The Dixie Highway Commission and the band of enthusiasts that accompanied them on their tour from Chicago to Miami, Oct. 9-21, found that there were still some discouraging conditions existing on that route. After they left Louisville they found something worse even than Illinois gumbo in the sticky red mud of Kentucky. Around Bowling Green mule teams had to be employed to pull some of the cars out of the mire. In Illinois and Indiana some fine road was encountered, especially in the latter state. Some of the party would not advise tourists to come south over the route before next summer.

Gillespie county, Texas, votes November 7 on $300,000 bonds to construct roads.

GOOD ROADS NOTES IN BRIEF

Upshur county, West Virgina, votes December 30 on a $250,000 bond issue for roads.

Angelina county, Texas, has provided $200,000 to be used immediately in highway construction.

Leon county, Florida, in which is located Tallahassee, the capital, has voted $200,000 road bonds by an overwhelming majority. Road elections held in most all the Florida counties on the Dixie Highway route have been successful.

Carter county, Tennessee, has awarded contracts and work has begun on thee onstruction of 65 miles of roads.

Petitions have already been presented to take up the full amount of the $225,000 bonds voted for street paving in Sumter, S. C.

The Norfolk, Va., city council has appropriated $4,800 for the purchase of toll roads and bridges within the city limits.

An organization has been formed in Chicago to build a paved highway from the Mexican to the Canadian border. It is to be 2,200 miles long, to be made of concrete or brick and to cost $20,000,000. Automobile clubs, it is reported, have subscribed $100,000 for promotional work.

The Dustless Air Line Route from Indianapolis to Chicago has been chosen as part of the Jackson military highway.

The Louisiana State Good Roads Association held its meeting at Alexandria, Oct. 29-30. The question of a system of state highways was discussed.

The million dollar highway system surrounding Lake Charles, La., a great lumbering center, has been practically completed.

Governor Hays, of Arkansas, has authorized the expenditure of $5,000 in making preliminary road surveys in the state.

Work is now under way of highways near Rogers, Texas, in Bell and McLennan counties, to cost a quarter of a million.

A $350,000 viadnet is proposed to be ereeted next year as an aid to traffic between Arkansas and Tennessee near Memphis.

Contract has been let for the construction of a highway in Marengo county, Alabama, to cost $60,000.

Medina county, Texas, has improved 200 miles of good roads with an expenditure of only about $20,000.

The board of public works of Tusealoosa, Ala., and the county commissioners will split the expense of constructing a mile of model paved road in front of the University of Alabama.

Contracts for dredging for shells to build good roads have been let by the county commissioners at Jacksonville, Fla.

Bruce Smith, of Sheldon, Minn., has been sent to China by a big St. Paul firm to direct the building of a great government road in that country.

Zavalla county, Texas, Road District No. 3 votes November 2 on $40,000 bonds for road construction.

Pinellas county, Florida, votes November 16 on $715,000 bonds to construct 73 miles of brick road, for which contract has been awarded.

Prima county, Cal., the home of Pasedena, is considering the issuance of $2,650,000 worth of county bonds to build a complete system of public highways of the most modern pattern.

Highway Bridges and Structures

Discussion By CLIFFORD OLDER, A. Am. Soc. C. E.,
Bridge Engineer, Illinois Highway Department

THAT VERY LARGE sums of money are annually spent in the United States for the repair and renewal of poorly designed highway bridges is beyond question. It is also a clearly demonstrable fact that the greater part of this expenditure may, in the future, be rendered unnecessary by placing the design, construction and maintenace of highway bridges under competent engineering supervision.

The avoidable annual expenditure for highway bridge purposes can only be estimated, as exact figures are not obtainable. Illinois spends annually about four million dollars for highway bridge renewal and maintenance; this figure is about one-half of the ordinary road and bridge fund of the state. Iowa reports for the same purpose the expenditure of more than five million dollars for the year of 1915. This is also about one-half of the road and bridge fund of that state. Kansas and Wisconsin also estimate that about one-half of the ordinary road and bridge fund is expended for bridge work.

If this proportion holds true for all other states, then of the two hundred million dollars annually expended in the United States for roads and bridges on other than state aid work, approximatelyy one hundred million dollars is expended for highway bridge purposes.

Data collected by the Illinois Highway Department plainly indicates that, had all highway bridges built in Illinois during the past twenty years, been designed and constructed in accordance with the best engineer practice of the period, considerably more than one-half of the present annual expenditure for bridges would not be necessary.

As an illustration, the "King Arches" mentioned in Mr. Gearhart's paper, were probably designed as well as engineering practice of fifty years ago would indicate as necessary at that time, and as a result, the average life of these structures in Illinois has been fully fifty years. In contrast to this distinctive record, the average age of all old highway bridges now being replaced by more permanent structures, is less than fifteen years. This illustration seems to indicate that the number of bridges renewed each year may, in the future, be reduced to one-third of the present figure.

Assuming, however, that competent engineering supervision of highway bridge construction and maintenance may eventually make possible a reduction of one-half in these items, the saving for the United States, as a whole, may conservatively be placed at one hundred million dollars per annum.

That it will amply repay every state, in which state control of highway construction is not now exercised, to establish a highway department well supported by proper legislation, is a logical conclusion.

Ways of Saving Expense.

A brief review of the principal items which swell the total expenditure for the repair and renewal of highway bridges, will show the feasibility of making a very marked reduction in the future cost of the bridge maintenance.

Grossly defective foundations, which render the bridges particularly liable to flood damage, are responsible for the greatest number of early renewals. It is a fairly common occurrence, in the office of the Illinois Highway Department, to receive a report that fifty or perhaps one hundred square miles of territory has been swept practically clean of highway bridges. A report of an excessive rainfall in certain of the less progressive sections of the state, is sure to be followed by a report of a heavy loss to the drainage structures. In other sections, where, due to some original precedent, it has been the prevailing practice to provide stone, and, more recently, concrete foundations or complete reinforced concrete structures, flood damage is comparatively insignificant.

Another very important item of maintenance expense is the matter of repairs to the plank floors which, until recently, were provided on practically all highway bridges. This item may be greatly reduced in a comparatively short time by replacing the planks with creosoted blocks on creosoted sub-plank, creosoted sub-plank with a bituminous gravel wearing surface, or even by the use of creosoted plank alone when the traffic is so light as to cause but little wear. In using such floors on old bridges, due consideration must be given to danger of overloading the superstructure, the expected length of life of the bridge and the character and magnitude of the traffic as related to the cost of maintaining the floor.

New bridges may be provided with any one of the several types of more permanent bridge floors now available. Considering maintenance, any of the best modern pavements will show economy, when compared with an ordinary plank floor. There may be exceptions to this in districts where timber is comparatively cheap, when the present price only of timber is considered.

Decay is the natural cause of the expense of maintaining old wooden structures and cannot be avoided.

The construction of creosoted timber structures is well worth considering under some conditions.

The rusting of steel superstructures is the cause of a considerable number of bridge renewals and this can easily be remedied by the proper application of protective coatings.

Damage, due wholly to excessive live loads, is comparatively rare, except in the cases where the immediate cause of the accident is the rotting of wood or the rusting of steel.

The greater part of the flood damage to highway drainage structures in Illinois, and probably elsewhere, occurs because of the neglect of the most elemental principles of bridge and culvert design and construction, when engineering supervision is not exercised.

The substitution of steel "legs," "posts" or "tubes" for adequate masonry foundations, is the principal defect.

The lack of a sufficient waterway area is comparatively of little importance and, in fact, most of the old bridges in Illinois provide very generous waterways. This condition is due partly to the fact that, under the old system of letting bridge contracts, the bidders dictated practically all features connected with the structure, and the theory, "the larger the bridge, the greater the profit" has had much to do with the more than adequate waterways usually provided.

The general policy of the Illinois Highway Depart-

ment is to provide, in the design of the new bridges, a waterway area large enough to pass the entire ordinary flood flow of the stream. No attempt, however, is made to provide for the extraordinary flood which is not expected to occur more frequently than once in forty or fifty years. The magnitude and frequency of such extraordinary floods, however, are still largely matters of opinion or judgment, although the Illinois Rivers and Lakes Commission is undertaking the collection of data bearing on this subject.

The construction of low water bridges which are not expected to pass the ordinary flood flow, should not be approved for well developed agricultural territory, without due regard to the character of the farm products, the future agricultural development of the territory, and the present or possible future use of the road for more than local traffic.

Large areas of Illinois are devoted to dairy farming and truck gardening and many of the principal roads have developed into well defined automobile routes. These conditions make it imperative that the highway traffic be delayed by high water or other cause, as little as possible. Except in rare cases, therefore, all new bridges are planned to carry the entire ordinary flood flow through the opening.

Under the direction of the Illinois Highway Department, a bridge survey, which covers about one-half of the area of the state and almost exactly one-half of the road mileage, has been made. A summary of this survey throws some light on the desirability of issuing bonds on a large scale for replacing highway bridges with more permanent structures and is otherwise of general interest.

On 48,426 miles of road were found 97,963 drainage structures of all sizes. The total length of all these structures, as measured along the axis of the road, is 770,000 feet or about 145.9 miles. The average number of bridges per mile is 2.12; the average length of bridge per mile, 16.46 feet and average length of each bridge is 7.76 feet. Of the total number, 1.8% are more than 60 feet long; 21.8% have a length of from 9 to 60 feet and 76.4% are 8 feet or less in length.

The following table gives the percentage of each class of structure found:

Wood structures	34.9%
Corrugated pipe	18.2%
Vitrified tile pipe	13.0%
Concrete, reinforced concrete and stone masonry	10.1%
Steel superstructures or steel tubes, legs, etc.	8.8%
Steel superstructures on masonry foundations	7.2%
Plain steel pipe	3.8%
Wood superstructures on masonry foundations	2.3%
Cast iron pipe	1.7%

Of the total number of bridges 9.8% were reported as needing repairs and 8.7% as needing replacement at the beginning of the construction season of 1916.

As the survey covered almost exactly one-half of the area and road mileage of the state, the total number of bridges may fairly be assumed to be double that given above. The percentages, however, should not vary materially.

At the beginning of the construction season then, there were in Illinois about 19,000 drainage structures needing repairs and 16,000 needing replacement.

The average cost of all bridges built under the direction of the Illinois Highway Department is about thirty-one dollars and fifty cents per foot. The cost of the average bridge, which is 7.76 feet long, would then be about two hundred, forty-four dollars. The average cost of temporary repairs to the old bridges is about one-fourth the cost of a new structure. The cost of repairs to the 19,000 bridges would then be about $1,000,000, which leaves $3,000,000 available with which to replace worn-out structures with modern bridges. This amount would build about 12,000 average structures. As against this there were about 16,000 to replace at the beginning of the season.

It seems evident, therefore, that if modern structures are to be used in Illinois for all replacements, it will be necessary for the next few years to provide a larger fund by issuing township or county bonds, or by other means. If modern structures are used for all renewals, however, the wood and other short-life bridges will quite rapidly disappear, the cost of repairs will decrease, and the renewals may easily be handled out of the ordinary road and bridge fund.

With our present favorable bridge law and considering the progress made in the movement for the construction of only the most permanent bridges, we estimate that in from twelve to fifteen years our bridge expenditures in Illinois will be reduced about one-half.

Concrete Road in North Carolina.

The first concrete road in North Carolina has been constructed in Forsyth county, says the Manufacturers Record. The county authorities had planned to improve the Bethania Highway, on which borders the magnificent estate of R. J. Reynolds, the tobacco king, but the work was not to be done for a year or two, and then of the usual oil-treated macadam construction.

Mrs. Reynolds, wishing to get the road completed this fall, made an offer to the Forsyth Highway Commission to finance the construction if the road was made of more permanent material. A rather unique agreement was entered into. It is said that this provides that an amount of money equal to the cost of the macadam road is to be repaid to Mrs. Reynolds on September 1, 1916, and the difference between the cost of the macadam and concrete is to be paid back to her by the cancellation of her state and county taxes from year to year until the amount is liquidated.

Construction work is now under way. It will serve a very practical purpose as one of the main connecting links in Forsyth county's good-roads system, and will tend to beautify the approach to one of America's magnificent estates.

Appalachian Counties Busy.

Road enthusiasm of a kind found heretofore only in the most prosperous and highly developed sections is abroad where Tennessee, Kentucky, Virginia and West Virginia mingle, says the American Motorist. Recent expenditures in this vicinity total more than $8,000,000, and more recent plans, including actual bond issues, call for the continuance of the work on the same scale.

The tier of counties in Kentucky from Cumberland Gap to Crab Orchard, a distance of about 100 miles, have all provided bond issues to build their respective portions of the Bristol-Lexington highway. Work is progressing in Virginia counties on this road and the entire road has been provided for with the exception of two short links in southwest Virginia counties. This means that in all probability this through highway between Bristol and Lexington will be completed within another year. Work is progressing also on the Bristol-to-Washington highway, and Montgomery county, Virginia, is soon to vote upon the question of a bond issue for this and other road work. To the southeast of Bristol, Avery county, North Carolina, has voted bonds for the building of its link of highway to connect Bristol with the famous summer resort at Linville, where the trout streams of Western North Carolina are attracting hundreds of visitors each summer and fall season.

Dr. Charles E. Wait of the University of Tennessee, whose entertaining description of the Knoxville-Roanoke route appeared in the American Motorist last month, is highly optimistic regarding his state's participation in the good roads program. Dr. Wait takes a keen interest in road matters, and in a letter to the American Automobile Association says that besides Knox county voting $500,000 for roads, Hawkins county, in which is located forty-two miles of dirt road on the Knoxville-Bristol route, has likewise appropriated $500,000.

For Great National Roads.

Writing from Linden, Tenn., Mr. J. D. Daniel makes a plea for a larger interest in the building of a great system of National Highways under the supervision of the Federal Government. He believes a half billion dollars would turn the trick handily. Mr. Daniel says:

"I wish to assure you that I am interested in good roads for the South, and I enjoy reading your journal and appreciate its good work for the great cause of good roads.

"Not only am I interested in good roads for the South, but interested also to see a system of good road built throughout the United States, connecting all county seats, for purposes of post roads, for interstate travel and traffic as well as local travel and traffic at all times, and for military purposes in times of war or other disturbances of like nature.

"In view of the purposes of the system of highways as given above, I should like to see the matter taken up by the federal government. Let the government build the roads and maintain them as federal thoroughfares. In a general way this system would mean highways about thirty miles apart running north and south and east and west. It seems that such a system of roads should not cost the government much more, if any more, than $500,000,000.00. This expenditure would be far more beneficial to the people of the United States than the expenditure of one billion dollars proposed for our national defense

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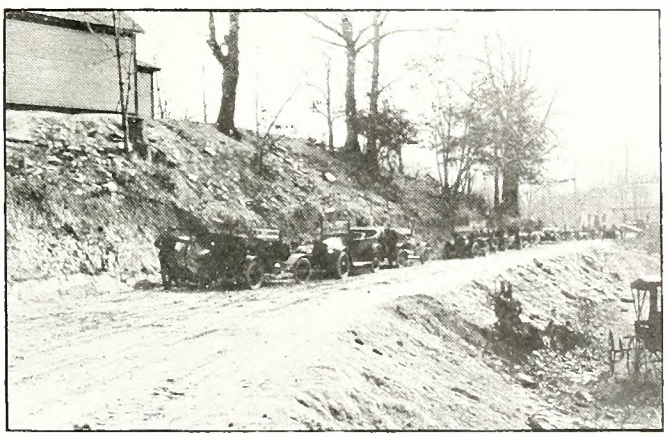
Completion of Hickory Nut Gap Link Celebration

By N. BUCKNER

Secretary Asheville Board of Trade

A CELEBRATION of state-wide importance was the official opening of the Asheville-Charlotte Highway at Bear Wallow, Saturday, November 6th. This highway is the first in North Carolina on which state convicts have been worked. The seven and one-half mile link of this highway in Henderson county across Hickory Nut Gap Mountain is considered an unusual feat in road building, as up to 1913 the matter of building a road across this mountain had been considered an impossibility because of the expense necessary to cross this steep rugged mountain, much of which had to be done through solid rock.

The principal speaker at this celebration was Gov-



Autos Parked on Asheville Side of Grounds, Looking Toward Bat Cave

ernor Locke Craig, who stated that in maintenance of the convicts it had probably cost the state about $50,000, most of which, however, would have been expended for their maintenance elsewhere, but even at this figure he considered the completed road was worth ten times that amount to the section which it traversed, Western North Carolina and the state as a whole. Governor Craig congratulated the people of the community and Western North Carolina on what has been done for the entire state and for the communities beyond the state, for the people of other communities of other states in the completion of this splendid highway over which they come into these wonderful mountains of Western North Carolina to enjoy the splendid climate, good water and hospitality of our people. He said that this road or highway had been up at Raleigh in every meeting of every kind that had been held there since he had been elected governor, and referred to Senator Zeb. Weaver introducing the bill providing for the convicts on this road. He further said "the building of roads by state convicts is a policy that has not heretofore been in operation or adopted by the state. Superintendent J. S. Mann, of the state prison, has been in favor of working the men on the roads and keeping them here to finish the road. Without the convicts this road could never have been built. The people ought to have the road, but it would never have been possible for the people to build it without help from the state. The only other road in the state where state convicts have been building a road is over in Madison county, but they were not as clearly entitled to a road built by the state convicts as were the people here in Hickory Nut Gap, the completion of which gives them a good road into Asheville; and Hendersonville and Rutherfordton, and the people of other sections of the state a good road to get into these beautiful mountains; also a road across the mountain at the Swannanoa tunnel to Old Fort, which will give the western section four great highway from the east into the mountains, the others being one from Greenville, one from Spartanburg, and one from Salisbury by way of Old Fort, Round Knob and Ridgecrest into Asheville.

Much Recent Progress.

"Since the beginning of my administration there have been twice as many miles of road built, improved roads I mean, in North Carolina as in all the past history of North Carolina; more roads been built in the state in the past three years than since the time Columbus discovered America; in fact, since the time of Adam. The people are demanding easy and economic means and methods of transportation, and they can't have them with the old-fashioned roads. In 1913 there were but little more than 5,000 miles of improved roads in North Carolina, while now, in 1915, there are more than 15,000 miles of improved roads in North Carolina. We have built in the state since 1913 about 10,000 miles of improved roads, with more being rapidly constructed. There are about 50,000 miles of roads of all kinds in North Carolina; 15,000 miles of

Picturesque Curve on Hickory Nut Gap Mountain. Asheville-Charlotte Highway

improved roads, leaving 35,000 miles of roads to be improved, and we do most sincerely hope that all of the leading roads in the state may soon be made improved roads that will be a credit to the state and the people. The time has come when the horse and the ox will have to get off the highways and give place to some other force more economic in the way of transportation. And when the people wake up to the importance of better roads we will have them. The time will come when we will have to have good roads whether we want them or not; if not we will be left behind in the march of progress. Good roads means good farming. A man cannot have a sorry farm with a good road passing by. In dedicating a great public highway like this Hickory Nut Gap road we are dedicating an institution of the same character as the church and the school house. The men who build roads are serving God too, as is the man who pays the tax to build them, just like the preacher and the school teacher. Good roads mean better corn, better wheat, better churches, better schools, better men, better women. Scrubby men cannot be kept on good highways. They must become better men or get farther back into the hills. I believe that the most favored spot on earth is here in the glorious mountains of North Carolina. It is a land, an inheritance for us, with its marvelous climate, pure water, its brooks and streams and rivers, where we have no flies, or very few of them, because a fly cannot live on these rocks; no malaria, and no diseases except those we can ourselves get rid of. In everything, except climate and rainfall, man can change conditions; everything, except climate, and this wonderful climate we do not want to change, for we cannot make it better. Man can even change the face of the earth, in making things grow where nothing grew before, and even in the matter of rainfall he can make the change, for by irrigation man has changed the desert into a blossoming garden. And there to the convicts, who are coming down to enjoy a day of rest and pleasure with us at the suggestion of Superintendent Mann as we came by, I have a word of encouragement, for though they have erred, they are yet men, and are doing their duty well."

The First State Aid Road.

Following the calling of the meeting together by Columbus Oates, Chairman of the Hickory Nut Gap Highway Committee, the object of the meeting was stated by Dr. Joseph Hyde Pratt, State Geologist, who spoke in part as follows: "We are here for the purpose of celebrating the construction of the Hickory Nut Gap Highway, the first section of road in the state to be built with state aid. It is a seven mile section of a great highway leading from Asheville to Charlotte. The upkeep and maintenance of this section of highway has been provided for by an act of the legislature, which apportions the expense to the three counties of Buncombe, Henderson and Rutherford. When the completed road is turned over to the three counties the board of county commissioners of each county will each appoint a commissioner to have charge of the upkeep and maintenance of the road. I speak advisedly when I say we are here to celebrate the construction of the road. It is practically completed. In from thirty to forty days it will be finished. It was thought

best, however, to celebrate the construction of the road at the present time rather than to wait until about the first of the year. I wish to impress upon the county officials of the three counties, the importance of maintaining the highway in good condition. Its maintenance is just as important as its construction. The importance of this seven and one half miles of highway can hardly be overestimated. It will do more for the building up of the tourist traffic in Western North Carolina than any other roads in this section of the state. It will benefit the people as far east as Charlotte and Raleigh. In view of the great cost of constructing it over the mountain, it was impossible for it to have been constructed without state aid. On account of the number of counties and sections of the state benefitted by its construction, it is altogether proper that state convicts have been used in building the highway."

Representative Gallatin Roberts and R. R. Williams, speaking for Asheville and Buncombe county, both made short addresses. Representative Roberts paid a tribute to the enthusiasm which the members of the board of county commissioners in Buncombe county are displaying in the matter of building good roads, and declared that the approach to the Hickory Nut Gap road from Buncombe county to the top of the mountain and to the Henderson county line is a marvel in more ways than one. The speaker stated that he wished every taxpayer in the county could see the beauty of this road which winds up a steep mountain with a grade of less than five per cent. Speaking as a representative of the citizens of Buncombe County Representative Roberts said that he could guarantee that his home county would do its part in maintaining the Gap road. He declared that while chief credit for the building of the Gap road belonged to our good roads Governor, Locke Craig, he wished especially to call attention to the ardent support of the highway by Representative Harry Nettles and Guy Roberts of Madison county.

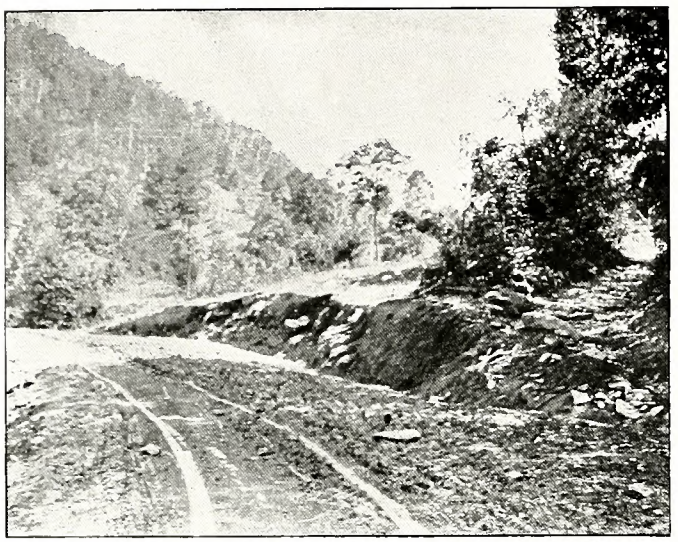
Beginning of New Epoch.

Mr. Williams spoke in part as follows: The completion of this highway marks an epoch in the building of good roads in North Carolina. The state has taken up the work of aiding in the construction of highways. The bill passed by the legislature of 1913, making possible the building of the highway with state convicts was prepared by Sol Gallert, of Rutherford

Modern Road Builders—Two White Trucks. Part of Buncombe County, North Carolina, Equipment

Governor Locke Craig Speaking at Celebration of the Completion of Hickory Nut Gap Road

county, who brought it to me for introduction. Dr. M. H. Fletcher, who worked unceasingly to make up the funds necessary for the buying of dynamite, and tools for the building of the road, deserves the highest commendation for his labors, as the legislature provided



On Hickory Nut Mountain, Showing New Road in Foreground, Old Road at Right

only the convicts' labor, thus leaving the raising of the other necessary funds to private effort. This road is but a beginning of highway construction in Western North Carolina.

Speaking on the subject of 'Building the Highway,' Dr. M. H. Fletcher pointed out that although the state had at great expense furnished the convicts for the actual labor of building the road, for the buying of supplies it had been necessary to raise $5,000 by local subscription. Of this amount Dr. Fletcher stated the Coxe Estate in Asheville had subscribed $1,000; the town of Edneyville, $1,500 in bond issue voted, while the balance of money collected for this purpose, $5,761.60 spent for dynamite, tools and other supplies had been secured by collections from citizens

J. S. Mann, superintendent of the state prison at Raleigh, said: Upon this occasion of the celebration of the practical completion of the highway, I don't believe any man can properly appreciate the value of this road. It has already compelled the building of several connecting links. It is of great advantage to the people of the mountain sections of the state. It gives them three markets for their products, and through these local markets, they can reach any market in the country with their produce. In addition it is a standing invitation to tourists to visit this beautiful country.

Others who spoke were H. B. Varner, of Lexington, N. C., Sol Gallert, of Rutherfordton, Dr. George T. Winston, of Asheville, and Mayor Brooks, of Hendersonville.

County Commissioners, with other county officials, attended the celebration in a body.

Following the speaking the hundreds attending the celebration were entertained at a picnic lunch served by the residents of the Hickory Nut Gap highway. Probably one hundred automobiles were used by the various delegations and guests attending the meeting, many of whom made the return trip to Asheville over the new highway by way of Bat Cave, Hendersonville and Biltmore.

Old and New Method of Transportation on a Mountain Highway in North Carolina

Proper Road Location --- Its Importance and Effects

By WM. R. RAY

State Highway Commissioner of Washington

THE OBJECT of this paper is to present, briefly, some of the phases of this subject which confront the highway engineer at this time.

The purpose of a highway is to carry traffic. The traffic will naturally vary with the district which is producing or attracting traffic; so the first consideration of the locator, in the broadest sense, will be the district to be served. It may be said that the districts requiring highways fall naturally into three classes, which may be designated as urban or residential districts; scenic districts, and agricultural districts. On account of the fact that these classes necessarily overlap in many cases, the distinctions indicated have their greatest effect upon the location of highways, rather than upon the details of construction, where a broad gauge general policy is to be followed by the executive charged with highway administration.

In referring to urban or residential districts, I have in mind the suburban areas which are adjacent to most of the large cities of this country, with at least a fairly "well-to-do" population, able to own comfortable homes and to pay for the extra transportation required by the greater distance to the business centers. Such a district both produces and attracts traffic. The original development of such districts was made possible by the electric railway; the highways were of secondary importance, now the small motor vehicle has become the important factor in transportation, and the development of highways has become of first importance. The traffic produced by such a district will be almost exclusively comparatively light passenger vehicles with ample power to climb almost any gradient even up to 20@. The hauling which the district requires will be confined to materials for the construction of new residence or other buildings, and such heavy supplies as fuel. The locator therefore will have as his first consideration what may be called the accessability of the highway, and safety of the traffic. He will not be confined to a narrow range of gradients, but will endeavor to find a proper middle ground between the extremes of grade and cost of construction. In locating a highway for the residential development of a previously unoccupied district, the engineer has his greatest opportunity. The proper location will involve plans for connecting drives to the main artery; consideration of the future requirements of the community for sewerage and storm drains; the disposal of surface water; intersections of existing, or contemplated, railways; and the possibility of snow blockades in winter. As in most cases the cost of such a highway must be considered an eventual charge upon the property of the district; the choice of proper location is too frequently restricted by that cost; but the attitude of the public toward this factor is improving with the increasing demand for safety of traffic.

Difficulties in Scenic Roads.

The location of highways into scenic districts brings with it a set of problems which are pre-eminently of an engineering nature. The purpose of such highways is to afford access to districts of natural beauty. The choice of routes may be influenced by the existence of attractive camping grounds, in addition to the principal points of interest which are to be reached. The only restrictions placed upon the engineer are of expense and safety of travel. Another consideration which is rapidly becoming of first importance with the extension of this type of highways, is the cost of maintenance. This is particularly true in the mountains of the Pacific Coast, where conditions of soil, drainage, and snowfall, have a vital bearing on upkeep costs. Gradients as high as eight or ten per cent may be utilized in order to keep the cost of construction within reasonable limits, but these gradients should be reduced on sharp curves in the interest of safety. The importance and effects of proper location will be seen in the resulting popularity of such highways, and in the much talked of development of our natural resources.

Problems of a somewhat different type are encountered in planning highways for a large farming district of a flat or only gently rolling topography, where the farms are held in large units and the population is scattered. The prevailing systems of roads usually follow the subdivisional lines. The traffic will be heavy at certain seasons of the year only. On account of local prejudices, it is often very difficult to select any highway, or system of highways, for extensive improvement. With existing highways on the rectangular system, it is seen that a farmer living eight miles in an air line from town, may have to travel from nine to twelve miles along the section lines to reach his market. The ideal system for such a district would be a combination of the rectangular method with diagonal arteries radiating from the markets.

Roads in Farming Sections.

Existing roads in the thickly settled agricultural and industrial districts in the United States are also frequently laid out on the rectangular system, and in addition have been fenced up to narrow limits. Such a system can not often be used to best serve the modern requirements of the entire community, especially in a district devoted to truck gardens and dairy interests, where the bulk of the heavy hauling is fairly constant throughout the year. The location of a great trunk highway through such a district, and connecting industrial centers, should be along the principles long established for the location of railways, with the modification due to the permissable maximum gradients. The short-haul transportation of heavy commodities to the nearest suitable market or point of rail shipment is the important consideration. It is a generally accepted rule that the maximum gradient of such a highway should not exceed 5%; and the curves should be planned to afford a sight distance—that is, the greatest distance at which the drivers of two approaching vehicles may see each others' machines along the road—of not less than two hundred and fifty feet.

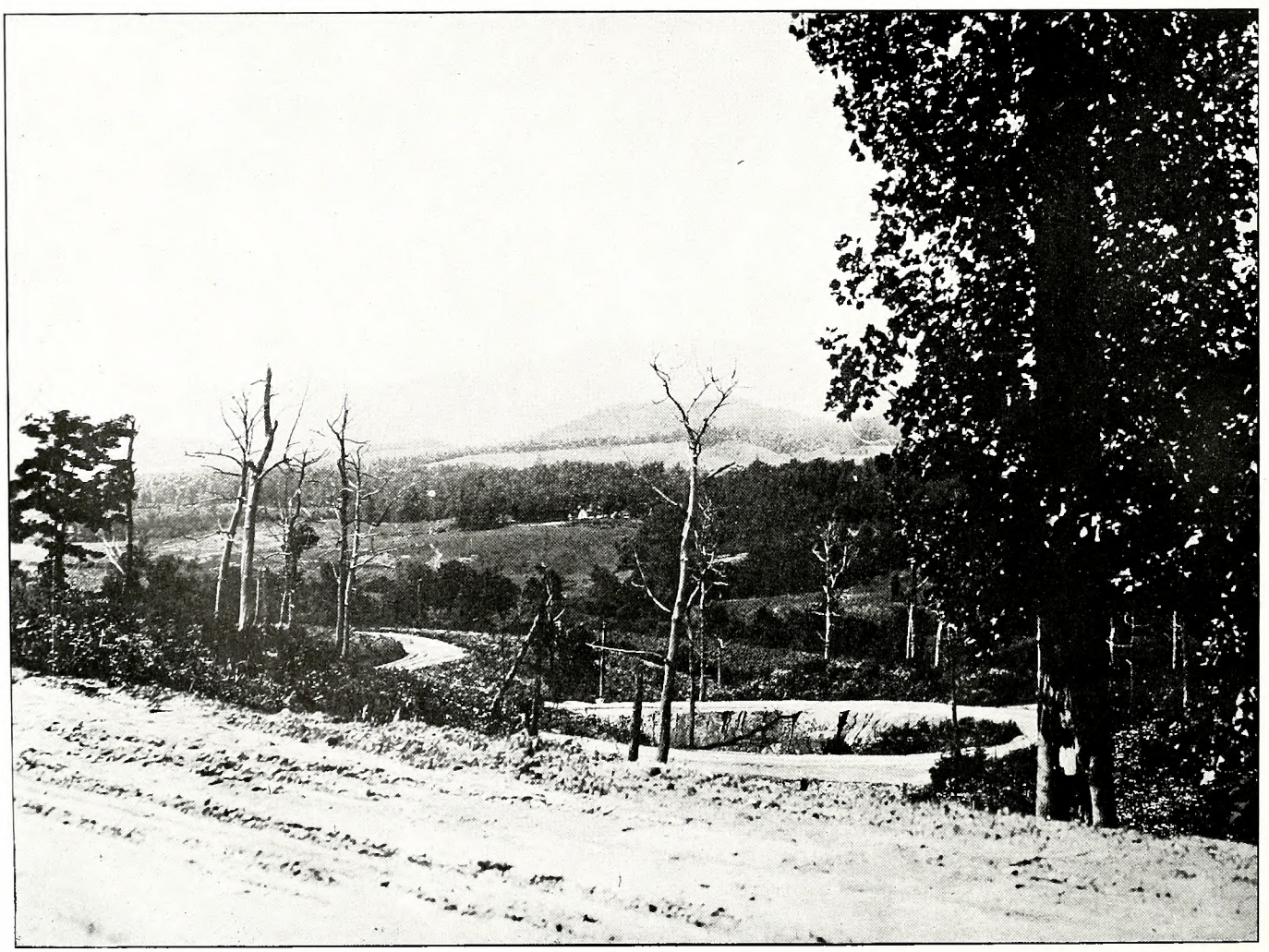
In a country of rolling topography, with frequent stream crossings and railway intersections, the route

which the engineer recognizes as the best location will almost invariably cut through highly developed property. The right-of-way for such an improvement will usually have to be obtained at high figures, both in the value of land taken, and in damages to the property thus divided. While this cost often seems prohibitively high, it must be recognized as being what we may call a "capital charge." Here again one is struck by the resemblance between the fundamental principles controlling the location of a railway and those which should control the location of a great industrial highway. While it may be somewhat foolhardy to attempt to predict future developments in short-haul transportation, the conditions which have arisen during the past six years may indicate, in some measure; what may be expected; and may be taken by the locator as his guiding considerations in selecting a route for a new highway or in improving the route of an existing highway. In the same way, it it not true that the development of the great railway systems may afford much counsel to any community in planning the size of the financial investment that should be made in a new highway? I refer particularly to the financial investment in rights of way, grading costs, and stream crossings, rather than to the surface structure of the highway.

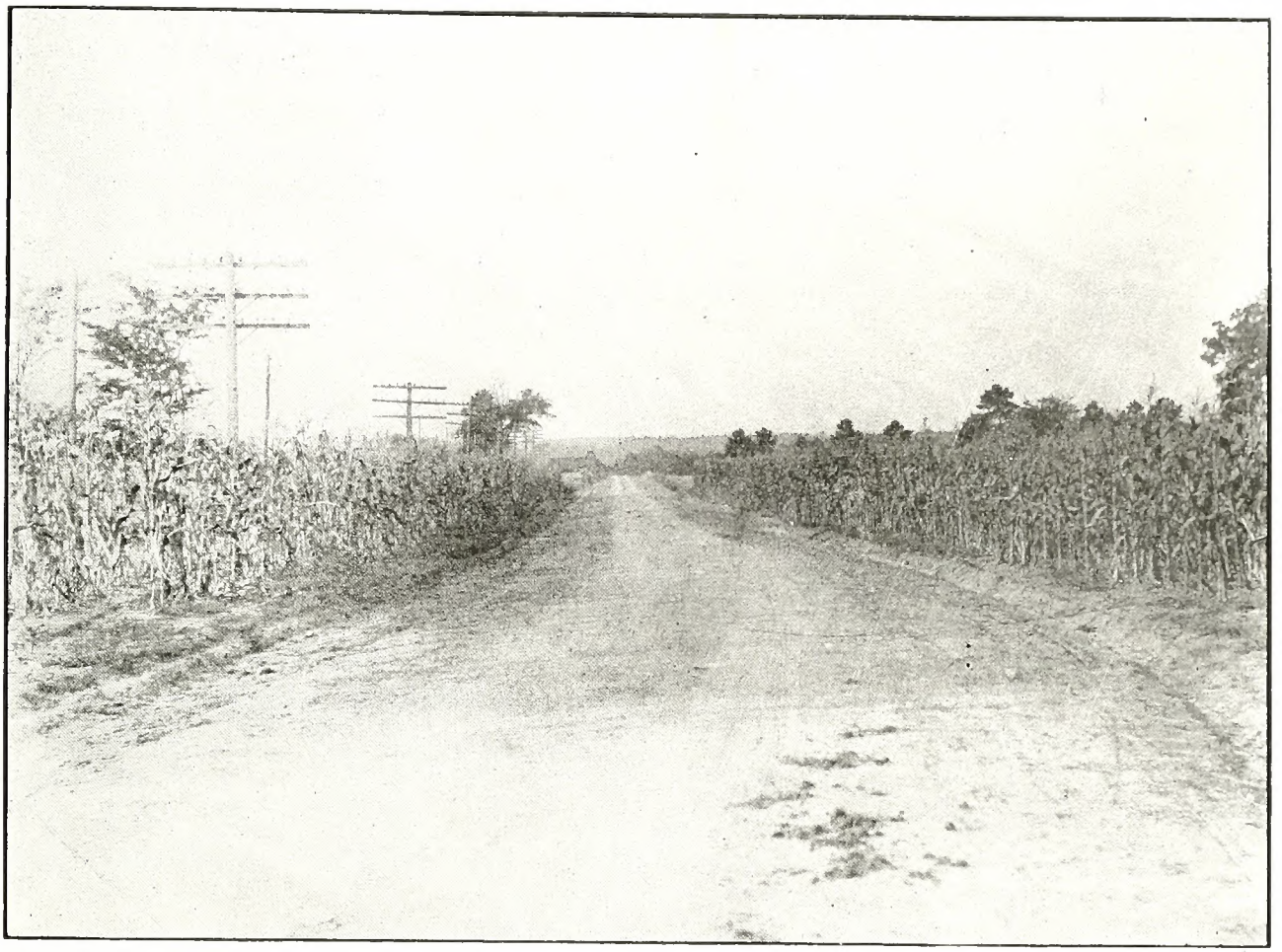
The Cost of Operating.

This brings us to the consideration of operating costs, and the influence that these costs should have in the locator's selection of a route. There are very few published data on the actual costs of motor vehicle operation, or the effects of grade and curvature upon those costs. This subject should be a fruitful field for investigation by our highway departments and technical schools. However, it is a self evident fact that more power is required to move a motor truck up a five per cent grade than over a level grade, or even one of two or three per cent. Also, it is probable that every person who has driven a motor car has noticed that a curve in the road on a five per cent grade will very appreciably increase the amount of power required to climb that gradient as compared to the power required to climb a similar gradient on a tangent. As the number of vehicle units increase, it must be evident that operating costs become of more and more importance in the matters which the highway locator has to consider.

To any person who thinks that the effects of grade and curvaturue on operating costs may be disregarded by the locating engineer in planning a highway of the type referred to, as being too finely drawn for present consideration, I wish to cite certain conditions which have developed in many sections of the Pacific Coast in recent years. No doubt similar conditions exist in all parts of the country, but I refer specifically to the Pacific Coast on account of personal observation of these conditions. We have many fertile valleys, capable of intense cultivation, which are closely settled, at least in the vicinity of the larger cities. These districts produce large quantities of vegetables, fruits, and dairy products—all commodities requiring prompt transportation throughout the year. In past



A Remarkable Picture of a Section of the Asheville-Charlotte Highway, on Hickory Nut Mountain, Buncombe County, N. C.



Top Soil Road on the Central Highway Between the Yadkin River Bridge and Lexington Through the Farm of J. R., S. T. and Emery E. Raper, in Boone Township, Davidson County, North Carolina

years these commodities have been hauled by the electric railways. Following the construction of improved highways, or at least improved surfaces, there has grown a formidable system of motor vehicle transportation, carrying both freight and passenger traffic. In handling freight, these motor vehicles collect produce practically at the farmer's gate, and deliver it to the door of the commission house or butter factory in the city, at the same freight tariff formerly paid to the railways, and with the elimination of the drayage charges at either end of the haul. A similar condition exists in the short-haul transportation of passengers. There have been placed in profitable operation many lines of large capacity passenger automobiles, which pass close to the farmer's door, and which will carry him to town quickly and conveniently, and at a reduced rate over the former passenger tariffs on the electric or steam railway lines. Probably no better example could be found of the truth that increased convenience in transportation will result in increased volume of transportation. This increased traffic in turn has produced more problems for the highway officials and locators. The highway that was built a few years ago, with the grades and curvature that seemed to the locator to be justified by existing traffic conditions and topographic obstacles, is now intolerably crooked, and the grades are too steep.

These conditions have been evident for some time to those officials charged with highway maintenance; at least we have heard the most about them from such officials through the medium of the technical press and from the platforms of association meetings and conventions. Is it not probable that at some not far distant time we shall begin to hear from the owners of motor vehicles about the cost of operation?

The Heavy Traffic Roads.

On going into this object, the engineer finds that the proper location of the heavy-traffic, year-around highway involves consideration of factors which have long been prime essentials in the best railway location; but which have not been supposed to be worth taking into account in planning a highway. Among these factors may be cited, in addition to the matters of grade and curvature already mentioned, the necessity for stopping and starting heavy motor trucks to pick up and discharge freight and passengers; intersections with cross-roads where the average speed may not be maintained; and the necessity for widening of the traveled way as the volume of traffic increases

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The good roads advocates of Roanoke county, Va., held a meeting November 15th to formulate plans for a comprehensive system of county roads. A considerable mileage of state aid road has already been constructed.

St. Louis and Kansas City business men propose to start a movement for a great highway connecting these cities by contributing $100,000 each.

The road commissioners of Atascosa county, Texas, have awarded the contract for the construction of $100,000 worth of good roads.

Washington County, Ohio, to Build Two Million Dollars Worth of Good Roads

By JOSEPH H. WARBURTON
Secretary Chamber of Commerce, Marietta, Ohio

WASHINGTON COUNTY, Ohio, is to have a good roads system equal to the best. The voters of this county have decided the question themselves. The majority in favor of the one and a half mill levy was 2083 in the county on Tuesday, Nov. 2nd.

The interesting thing in this election was that there was a bigger majority in the county than in the city—by about fifty votes. This proved that the farmer was with us, and that the campaign had been well planned and handled.

The one and a half mill levy will give us about $200,000 a year for five years, taking in the state funds, etc. This amount is to be spent on building roads, and will be in addition to the regular annual road work as carried out by the commissioners.

At the expiration of the five year period, we expect to renew the campaign, giving us a total of about $2,000,000 for building new permanent roads. When this amount has been spent, we will have our roads, and have them paid for and there will be no interest going out. In short, we will have $2,000,000 worth of new roads, and we will have had time to invest the money properly. The upkeep is taken care of out of other funds.

Just the kind of roads we will build has not yet been decided. We have built several miles of brick and several miles of concrete roads during the last few years, but these were on state, inter-county, and main market roads. Through a system of township organizations the county commissioners and Chamber of Commerce will work in taking care of each section's interest.

In putting on this campaign for good roads, the Chamber of Commerce was hardly mentioned after it was under way. The chairman of the Good Roads Division selected a good roads committee. This committee laid out the campaign from first to last, and decided that it should be a "County Campaign." That is, that a strong county organization should be formed and the campaign pushed through this organization.

The committee selected a newspaper man as county manager, and he got busy. It was a one month's campaign. The first thing was to get the Ohio Good Roads Federation to back the campaign. The co-operation of Better Roads and Streets was also secured. The county manager selected a county committee; this committee selected township chairmen; the township chairmen organized their respective townships, and the publicity campaign was launched.

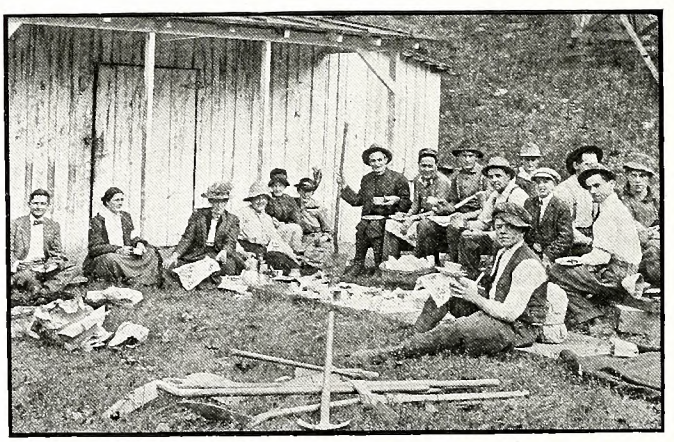
The Chamber of Commerce spent $500 in educational publicity. Every man in the county who would wear a good roads button reading "Good Roads—YES" was tagged. Thousands of pieces of literature were mailed out. Thousands of letters, both form and personal, were mailed to the voters, and the farmer was convinced that it was a county campaign and not a "city job." The last week of the campaign was devoted to delivering good roads addresses in every nook and corner of the county. Over fifty speeches were made during that week.

The county was well organized, and the campaign reached every voter. It was the talk of the county, even in the face of the "Wet and Dry" campaign and the county and city campaigns. The publicity campaign reached the spot. The fifty addresses reached the voter right in his own neighborhood.

The city was safe for the levy, although a good many laboring men felt that they did not use the roads, and that since they had helped to pave the city streets, that they should not be called upon to help pay for paving the county roads. But the 400 members of the Chamber of Commerce employ possibly seventy-five percent of the working people in the city and these members were asked to handle the campaign in their own places of business, and the plan must have been the logical one, for only about 700 people in the city voted against taxing themselves to build the county roads.

We feel that when a campaign is successful in getting people to vote a direct tax on themselves for roads or any other improvement, it is an indication that the Chamber of Commerce is of much value in promoting progressive movements.

The Board of Directors feel that our Chamber has at least accomplished a good year's work through its Good Roads Division. If nothing else is accomplished this year, a million dollar road fund is no mean accomplishment. The following editorial from the Daily Times covers the story a great deal better than the writer can:



Eating a Fine Dinner Served by the Ladies on Good Roads Day, Ritchie County, West Virginia

A Great Step Forward.

"Washington County is to 'get out of the mud.'" The day that we have been waiting for has dawned. The voters' declaration on Tuesday in favor of a special mill and a half levy for the next five years for road improvement indicates that the people have awakened to their greatest need, and that they are ready for the biggest step forward that the county has taken in a generation. The endorsement of this levy means that Washington county will in the immediate future begin the building of permanent roads, with money enough available each year during the five year period to permit

the systematic mapping out of road work and carrying it on steadily and rapidly. It means that the day is not far distant when it will be possible for the people to travel from one border of the country to another at all seasons of the year, and enjoy the numerous benefits which will attend such a condition. It means that Washington county is soon to take the place which is hers by right among the finest counties of a great state.

The campaign for the levy was short but effective and its success is a matter for general congratulation. While the organization which did the work included residents of all parts of the county, Marietta men were back of the movement and the sinews of war, the money that financed the educational campaign which was necessary, was provided largely by a Marietta organization, the Chamber of Commerce. Not only did the Chamber of Commerce back the good roads movement with a very substantial sum of money, but the chairman of its Good Roads Division, A. D. Follett, was delegated by the chamber to lead the fight for the approval of the levy and the direction of the campaign was placed in his hands.

Mr. Follett, the representative of the Chamber of Commerce, brought the Ohio Good Roads Federation into the campaign and in the plan of organization, which was adopted, he selected James F. Hovey, of this city, as the active county manager of the campaign.

Mr. Hovey having completed the county organization which proved a most effective one, formed its branches in every section of the county leading into the central organization in this city. There was no break, no hesitation, no let-up in the systematic work, and the results speak for themselves. The surprising and pleasing feature of the returns was heavy vote many of the rural districts gave for the levy.

Washington county should congratulate herself on the outcome of this campaign, which means so much to her. Then she should thank the Marietta Chamber of Commerce for a big work well performed, and the individuals who devoted so much of their time and energy and brains to the task. It was a big undertaking, the carrying of this road levy, and credit for it should be given fully and freely now, as it will be in the future."

Build Roads at Night.

Building roads at night with tractors equipped with headlights is the latest novelty in highway construction evolved by State Highway Commissioner Frank W. Buffum, of Missouri.

Directions were issued by his department to two road-building outfits in Osage county, one at Linn and the other between Westphalia and Rollins Ferry, to work two shifts. It is to take advantage of splendid weather and unusually fine conditions for grading work that the directions were issued.

"The two Osage county outfits," said Col. Buffum, "will work 16 hours a day, one shift from 4 a. m. to noon and the other from noon to 8 p. m. By equipping the tractors with powerful headlights the work can be done just as well at nights as in daytime."

Similar directions were issued to three grading outfits operating in Texas County and others will go out to other conties.

Concrete pavement in the United States increased from 364,000 sqnare yards in 1909 to 19,200,000 in 1914, donmbling over fifty times in five years.

Road Builders to Pittsburgh.

The executive committee, acting under the authority granted it by action of the Board of Directors of the American Road Builders' Association, has decided to accept the invitation of the city of Pittsburgh for its 1916 convention. The annual convention and show will, therefore, he held in that city, February 28 to March 3, 1916.

In order to supply the necessary facilities, the Pittsburgh City Council recently appropriated ample funds to put Mechanical Hall of the Exposition Building in shape for this convention. The building is city property, located in the down town district, on Duquesne Way, easily accessible to the leading hotels. The repairs will require putting in cement floors and a heating plant. When completed, it will be an ideal place for exhibitions such as those held under the anspices of the American Road Builders' Association. A hall for the sessions of the convention will be provided alongside Mechanical Hall.

The change in the time of holding the convention from December to the early part of the year has been under consideration for several years, and was decided upon after the most careful consideration of the question by the directors. The attendance at the conventions is always made up principally of highway offi-

A Colquitt County, Georgia, Sand Clay Road

cials, engineers and contractors—in other words, those who are engaged in the actual construction and maintenance of highways. It is, of course, desirable that the convention should be held at a time when these road builders can most conveniently attend, and although in December, during which month meetings have been held in the past, work is at an end in many places, it is true also that in not a few parts of the country work is carried on more or less extensively up to the first of January. Another point taken into consideration is that the holding of a convention early in the year makes it possible to reach many newly elected officials and engineers who take office at or near the first of the year.

The decision to hold future conventions in January or February having been reached, it was necessary to decide when the plan should be put into operation. Deferring the inauguration of the plan until 1917 meant that the 1916 convention would have to be omitted entirely or else held in the fall of that year, which would bring two A. R. B. A. conventions within a few months of each other. The Board of Directors felt that the omission of the 1916 convention was out of the question, and it was decided that the 1916 meeting should be held in January or February, and future meetings annually thereafter at the same time of the year.

Jackson Association Given Gavel

Souvenir of Wood From Tree at Andrew Jackson's Old Home in North Carolina, Presented at Nashville. Gift of Mrs. W. W. Watt

THE executive board of the Jackson Highway Association at its meeting in Nashville, Tenn., November 18, heard the report of senior engineer R. E. Toms, of the good roads department of the United States government. The pathfinding committee, composed of W. H. Crim, W. L. Brown and E. G. Dent, also submitted all data they had gathered in Tennessee, Alabama, Missouri and Louisiana. The definite location of the main route will be left to the whole board. The route from Nashville, through Alabama, by way of Birmingham, Montgomery and Mobile to New Orleans will not be definitely decided until the committee finishes its work next October. Definite guarantees for the building of the road through the different districts are being received. Mississippi is very much interested in the final selection and has in a bid for recognition. Suggestions have been made that a branch of the road go into Mississippi farther north than the proposed route through Birmingham and Mobile. This route would skirt the gulf from Mobile, going through Pass Christian, Miss., recently President Wilson's winter home.

MRS. WALTER WELLINGTON WATT
Charlotte, N. C.
Donor Gavel to Jackson Highway Association

A feature of the meeting in Nashville was the presentation of a gavel made from wood cut from a tree at Andrew Jackson's birthplace in Union county, North Carolina. The gavel was given to the highway association by Mrs. Wellington Watt, of Charlotte, N. C., President of the Daughters of the U. S., of 1812, was presented by Miss Alma Rittenberry, of Birmingham, Ala., Patroness of the Jackson Highway Association. In presenting the gavel Miss Rittenberry spoke as follows:

"It is my privilege to present to the Jackson Highway Association in behalf of Mrs. Walter Wellington Watt, president of the National Society of the United States Daughters of 1812, of North Carolina, this gavel made from wood of tree growing upon site of Andrew Jackson's birth place.

"Hunter, the Historian, says that to learn the history of the United States, you must first know the history of North Carolina.

"Andrew Jackson was born in North Carolina, March 15, 1787, in the state where the Battle of Alamance was fought between the British and the Regulators, May 18, 1771, the first battle of the Revolution. When a boy he was intended for the ministry, but he listened to the military accounts that reached his quiet neighborhood, of the heroic deeds performed by his brave countrymen at Lexington and Bunker Hill, Saratoga and Monmouth, and while he listened his heart burned with incipient patriotism, to avenge the wrongs of his native land. The young and middle-aged men around him were constantly training themselves for any emergency, and his mother encouraged rather than checked his growing passion for which he was designed. It was a critical time in the destinies of the infant republic, and she required the aid of every stout hand and strong heart, whether it beat beneath the surplice of the priest, or the rough habiliments of the backwoodsman.

"Bancroft says: Far up on the forest clad banks of the Catawba, in a region where the settlers were just beginning to cluster, Andrew Jackson's eye first saw the light. There his infancy sported in the ancient forest, and his mind was nursed to freedom by their influence. He was the youngest son of an Irish immigrant of Scottish origin, who two years after the great war of Frederic of Prussia, fled to America for relief from indigence and oppression. His birth was at a time when the people of our land were but a body of dependent colonists, scarcely more than two million in numbers, scattered along an immense coast, with no army, or navy, or union; and exposed to the attempts of England to control America by the aid of military force. His boyhood grew up in the midst of the contest with Great Britain. The first great political truth that reached his heart was that all men are free and equal; the first great fact that beamed on his understanding was his country's independence.

"The strife, as it increased, came near the shades of his upland residence. As a boy of thirteen, he witnessed the scenes of horror that accompany civil war; and when but a year older, with an elder brother, he shouldered his musket, and went forth to strike a blow for his country.

"Joyous era for America and humanity! But for him, the orphan boy, the events were full of agony and

grief. His father was no more. His elder brother fell victim to the war of the Revolution; another (his companion in arms) died of wounds received in their joint captivity; his mother went down to the grave a victim of grief and efforts to rescue her sons, and when peace came, he was alone in the world, with no kindred to cherish him, and little inheritance but his own untried powers.

"In the very beginning of this work of trying to create an interest in behalf of a National Highway as a monument to Andrew Jackson, Mrs. Walter Wellington Watt, of Charlotte, N. C., was appointed Chairman for North Carolina and has most loyally supported and encouraged the work. A beautiful woman of a charming personality, she has on more than one occasion represented the work, so I give in her own words this beautiful tribute to the work of the Jackson Highway, which was published in the Congressional Record of June 1913:

"'In behalf of the Jackson Highway, in my own behalf as state president, and in behalf of the North Carolina Daughters of 1812, as well as in behalf of the patriotic citizenship of North Carolina, the birthplace of Andrew Jackson, I file my earnest plea for the great practical and useful monument in the form of the public highway from the Lakes-to-the-Gulf which was launched under the auspices of the Alabama Daughters of 1912, in honor of the hero of New Orleans. Andrew Jackson was a man of action and one in whose veins blood ran warm and quick; therefore, no monument of unfeeling stone to him, no statue of cold metal, but better yet, a great utility to honor a great utilitarian, a pulsating, life-giving thoroughfare, devoted to the needs and pleasures of those whose prosperity and happiness were largely made posible by the tenacity of purpose and temerity of patriotism of this great North Carolina. Call it the Jackson Highway—build it better than Appius Claudius built the Appian Way, and, as near as practicable, along the routes of the doughty old warrior's military roads, and a monument will have been built to General Andrew Jackson, patriot, soldier, and statesman, that will survive longer than the Coliseum of ancient Rome, and reflect honor for the pride of posterity.'"

Credit to Whom Due.

In making a correction of an article appearing in the Nashville Tennessean, Miss Rittenberry gives the history of the organization of the movement to create a monument to this great president by constructing a fine highway to bear his name. Her letter follows:

"Dear Sir: As the policy of the Tennessean stands for justice and fair play, I wish to make this correction.

"In reading the account of the meeting of the Executive Board of the Jackson Highway Association in Nashville November 18th, when I presented a gavel to the Jackson Highway Association, I presented it in behalf of Mrs. Walter Wellington Watt, of Charlotte, N. C., President of the National Society of the United States Daughters of 1812, State of North Carolina.

"The gavel was made of wood of a tree growing at Andrew Jackson's birthplace. The reporter failed to give credit to Mrs. Watt.

"Also I am credited with originating the idea of a monument to "Old Hickory" in the shape of a national righway over the old military road throughMississippi. That is a mistake. I have never advocated a Mississippi route. From the very beginning of this work, started in Birmingham the 25th of May, 1911, the work was planned for a national highway as a monument to Andrew Jackson, splitting the Middle Basin, coming down from Chicago to Indianapolis, to Louisville, Nashville, down the old Louisville and Nashville Turnpike, through Franklin, Columbia, Pulaska, Dacatur, Cullman, Birmingham, Montgomery, to Mobile and skirting the Gulf to New Orleans.

"It was never suggested to cover any of the roads and trails that Jackson went over, for they are innumerable both in Mississippi and Alabama, except those in the route clearly defined.

"A great national highway is a far better monument to Andrew Jackson than to build a marble monument, though it may cost a million dollars, or a Grecian temple costing two millions.

"The Jackson military road would only end in Nashville, as Senator Oscar W. Underwood said in his speech during the convention in September. I think it most appropriate that Mississippi build that road and join the Jackson Highway at Nashville. Fayetteville, Tenn., and Huntsville, Ala., would come into the contest just as strong as Mississippi, but the route would commence at Fayetteville and end at the Horseshoe Bend battleground in Tallapoosa county.

"Decatur, Ala., is almost half way between Huntsville, Florence, Sheffield and Tuscumbia. The middle route, as first selected for a national highway, a Lakes-to-the-Gulf highway from Chicago to New Orleans, splitting the middle basin, as a monument to Andrew Jackson, is decidedly the best route. It is impracticable to leave our trade centers in building a national highway.

"My work from the very beginning of this project, which started five years ago, was purely educational to create the sentiment for this great highway, the Jackson Highway, as a monument to Andrew Jackson. The project had its birth, as I have above stated, May 25, 1911. It had its rebirth in the Birmingham Chamber of Commerce July 30, 1915, when a temporary organization was formed, with Peter Lee Atherton, of Louisville, Ky., President. The permanent organization was perfected in Nashville at the convention in September.

"Men of the very highest incentive, selected from the states through which the Jackson Highway passes, compose the executive board of the Jackson Highway Association, and they are working to obtain an impartial, fair and just decision, putting merit above sentiment, in selecting the route of the Jackson Highway, and best of all, they stand for good roads everywhere, which are so greatly needed in the development of the South.

Respectfully,

ALMA RITTENBERRY,

Patroness of the Jackson Highway Association."

Waverly district, Missouri, probably will tax its acres 10 cents each to build ten miles of rock road on the Cross-State highway. An election, authorizing a $49,000 issue of bonds for road purposes was held. Wellington district of Lafayette county already has voted away one stretch of bad roads, and Dover district soon will call an election for a similar purpose.

Beaumont and Kountze, Texas, soon will be connected by a shell road to cost $75,000. This was made certain when the commissioners' court of Hardin county, let the contract to shell the road from Kountze to Pine Island bayou. The road already is shelled from Pine Island bayou to Beaumont. A highway commission has been selected to act in conjunction with the commisisoners' court in the expenditure of this $75,000.

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GOOD ROADS AND PATRIOTISM.

Somebody recently made the statement that there would have been no Civil War had there been a Dixie Highway in 1860. The experience of the present leads us to believe that this statement is true. If there is one thing that is needed more than any other to make our country more thoroughly American it is good roads that link the different sections into one body. The people of this nation are very much abroad and the section that is most neighborly is the one that gets the true American spirit first. No patriotic man can ride over his own county good road without feeling just a little produer of his home. No stranger can come over that good road without feeling more kindly toward the people who built it.

Of course the danger of a sectional war passed forever at Appamattox, but there should be a more active interchange of ideas and interests between the South and other sections. The best way to bring this all about is to build roads that will be a joy to the man from North of Mason and Dixon line. There is lots of money up there that is just itching for an advantageous place in which to get to work. But the prospective investor is not anxious to place it where he would have to ride a mule or walk in the winter-time, or so rough and hilly in the summer that travel is one long agony of bumps and jolts.

THE DIRECT TAX DODGE.

In nearly every community in the South where the question of road bonds has been brought up there has cropped out a discussion of direct tax. Those who do the most talking for this latter method rarely ever do anything for the cause of good roads. It is usually their purpose to keep money from being spent for their construction by agitating something they realize has no prospect of success.

Direct tax is a good method where it is practical. But as yet there are few communities in the South that would be able to bear heavy enough direct tax to provide sufficient funds for work of appreciable magnitude. There is too much territory to be covered, too many roads to be built, too much grading to be done; and the sections only beginning to be developed. The case of New Jersey has often been brought into road campaigns in the South. Many good roads have been built there, and direct tax has almost universally been the method. But New Jersey is several times smaller than any state in the South, and a great part of her territory is level. New Jersey has more wealth than many states to the south, and as much or more population. There was no need for her people to vote bonds. But her example finds little place to fit in south of Mason and Dixon line. Ours is a growing section and the future can easily take care of any debts assumed for such public improvement. The proper growth cannot be attained with mud-clogged cow trails for public highways.

FLORIDA LOOKING AHEAD.

Florida the Beautiful has always been renowned for a number of things. Its shores received the first settlement of people from over the sea to come to North American shores, and quaint, beautiful old St. Augustine is seen by increasing thousands of tourists each year. More than any other state in the Union it is the abode of eternal summer. From January to December the fragrance of orange blossoms and myriad flowering plants is borne across its level expanse by the gentle winds from the Gulf to the South Atlantic. Here are thousands of acres of land, thought once to be fit only as a hiding place for savage Indians, snakes and alligators. But the genius of man is transforming Florida into a wonderland of nature.

Floridans have caught the spirit and sensed their opportunity. This once done, they mean business. No doubt about that, as upwards of eight million dollars provided in fifteen months for the building of good roads will bear evidence to. The war turned the great American tourist to his own country. Every advantage of climate and natural beauty that the shores of Italy offered could be met by Florida. Along the Italian shores and in sunny southern France there are thousands of miles of good roads. Florida realizes this and has taken her cue. The people who have the money to go to the great resort sections usually have the money to own motor cars. If they are going to

spend months they want to take these along. Florida will give them thousands of miles of as fine roads as France or Italy, and they will come in ever increasing numbers.

But more than that. These lands that were formerly thought worthless are now producing millions of pounds of vegetables, and these are ready to be put upon the Northern markets almost before the snow melts of frost ceases to form. These products will be moved from the outlying districts to shipping points by giant motor trucks in the future. These trucks must have good roads to accomplish economical marketing. Florida is a live one.

Quarter Billion for Roads.

Very nearly a quarter of a billion dollars was spent in highway construction and maintenance in the United States during the year 1914, as shown by statistics just issued by the Office of Public Roads and Rural Engineering.

One-fifth of the work was done under the state aid system, the State Highway Departments paying $24,220,000 and the counties and townships $25,193,000. State aid laws are in effect in 44 states, New Jersey having instituted the system in 1891 and Tennessee and Georgia being among the last to adopt it, in 1915.

Thirteen states spent $25,605,000 during the year in the construction and maintenance of state roads solely at their own expense, making a total of almost $50,000,000 paid directly out of state funds.

On third as much ($12,500,000) was spent for repairs and maintenance as was spent for new construction ($35,500,000.) This shows the enormous loss resulting from building types of roads whose surfaces are not durable under present traffic conditions. Six eastern states paid two-thirds as much out of the State Treasury for maintenance as for new construction, as follows:

	Maintenance.	New Construction.
Rhode Island	$ 146,800	$ 28,400
New Jersey	2,145,000	1,329,000
Pennsylvania	1,689,000	2,700,000
New York	8,628,000	12,856,000
Massachusetts	805,000	1,610,000
Connecticut	925,000	2,587,000
	$14,338,800	$21,110,400

There are now 247,490 miles of hard surfaced roads in the United States out of a total of 2,273,000 miles of public roads, or 10.9 per cent.

Last year 6,805 miles of state roads and state-aid roads were built, making the total of new roads built with such funds to Jan. 1 last, 35,477 miles.

South Welcomes Highways.

While the Dixie Highway and the Dixie Bee Line are two separate routes, yet the promoters and boosters of the latter highway rejoice at the tremendous reception given the inspectors of the Dixie Highway upon their entrance into Miami, Fla., after a tour of inspection which started at Chicago. Concerning the reception tendered the inspecting tourists the Miami Metropolis says in part:

'Miami screamed uproarious welcome to the Dixie Highway motorcade when it rolled into the city gates yesterday shortly after 1 o'clock—a welcome which far surpassed anything of the kind along the entire route from Chicago. Thousands of Miamians turned out to greet the officials of the highway association on the completion of their trip, and from the northern end of the county to the headquarters of the Halcyon Hotel it was one continuous procession of automobiles; horns tooting and whistles screaming. It was a fitting climax to the little drama the officials have been enacting in the interests of good roads, and was easily the "biggest thing" ever pulled off in Miami."

And thus the people of the South welcome the introduction into their country of improved highways. The reception at Miami, Fla., was something similar to the reception extended the officers of the Dixie Bee Line on their tour of inspection over the line a few months ago, and demonstrates that the movement for better highways, except perhaps in a few localities where tax payers are satisfied to travel through the mud through which their fathers and forefathers have plodded, is nation-wide.

Minnesota's Splendid System.

Expenditures in Minnesota for good roads will run far over $3,000,000 this year, largely exceeding the total for 1914, according to a statement by George W. Cooley Secretary of the state highway commission.

Already the state has distributed $750,000 to the counties to aid in the cost of road building and maintenance, on both state and county roads. By the end of the year, Mr. Cooley says, this will have reached $1,500,000, and at least an equal sum is being expended by counties and villages.

In a recent letter to the state efficiency and economy commission answering its request for suggestions, Mr. Cooley, secretary of the state highway commission, ial fund for road maintenance.

He recommended continuing the one-mill state tax, and making the state's share of state aid work 50 per cent. He strongly indorsed the present system, and letters from assistants in the department, along the same line, have been filed with the commission.

"The highway commission is now engaged," said Mr. Cooley, "not only on a general plan of road construction, but also in training along parallel lines all men who in the future may be expected to have charge of the road system of the state, and any change in the system would mean a different school for our engineer, conflict of methods and lack of harmony and unity. This would apply especially to the construction of bridges, which must, as a measure of economy, be as nearly as possible of uniform design."

Minnesota's system of road administration is more effective and benefits the state at large more than any system yet devised by other states, according to J. H. Mullen, deputy state engineer. The present organization, his letter says, gives freedom from politics.

C. B. Nagel, the other deputy engineer, suggests creation of an advisory board of five men, each one elected by the county commissioners of a group of counties, to study road needs and recommend changes in the system.

Invitations have been received by good roads enthusiasts in Minnesota to attend the second national conference on concrete road building, in Chicago, Feb. 15 to 18, and a Minnesota delegation will attend. Louis W. Hill, president of the Great Northern railroad, has been asked to deliver the principal address, Feb. 16. Mr. Cooley is the Minnesota member of the advisory committee.

West Virginia Teaches Good Roads

Course Open to Every One Interested---Why the Young Men and Young Women of the Country Desire Better Roads

MORE than 90% of the roads in West Virginia are and will be earth roads for many years. Therefore, in our efforts to get improved roads within the state, we would give attention to the dirt road so that it will satisfactorily serve the communities.

The State Road Bureau has issued bulletin No. 5 entitled Earth and Sand Clay roads. The bulletin is illustrated with drawings and designs showing proper grades and road sections. Ten copies of this bulletin with a like number of copies of nine other bulletins upon road subjects have been placed in the hands of the clerk of each county court to be distributed among the road officials of the county. A copy of this or any other bulletin of the department will be furnished free to any citizen who may direct a postal card to the bureau at Morgantown asking for such bulletins as are desired. The proper way to maintain an earth road is to keep its smooth, dry and properly drained. No instrument that has been applied to the road gives as good results for the time and money expended as the road drag. Under proper organization the roads can be dragged at cost ranging from 25 to 50c. per mile, which in most instances will be of greater value to the road than 10 to 50 dollars expended with the pick and shovel. The bureau has issued a bulletin on this subject (No. 3) which shows and tells how to make and use all kinds of road drags. This bulletin likewise is free. These bulletins should be acquired and studied by persons interested in the betterment of the roads in their communities. It is possible to have good roads in many sections if we only use the information which the state has gathered. Many communities would do well to ask for these bulletins and organize road improvement and road dragging clubs to co-operate with the road officials on the same line that the farm bureaus assist the county agents.

Third Annual Session of the School of Good Roads.

The third annual session of the School of Good Roads established at West Virginia University under the acts of the 1913 legislature will be held in Mechanical Hall of the University, Jan. 11 to 21, inc. The subjects of Road Care and Maintenance, Drainage, Road Systems, Planning and Location, Grades and Alignments, Highway Bridges and Culverts, Macadam, Tarvia, Asphaltic concrete, Concrete, Brick, Gravel, and other types of roads will be discussed and considered. Road economics and economical designs of roads and pavements, earth and sand-clay roads, cost accounting, uniform methods of accounting, uniform specifications, uniform plans and designs, standards and standardizing of road materials, equipment and methods, prison labor, management prison camps and other questions pertaining to the highway improvement will be considered.

A staff of experts in particular lines will be on hand to discuss the various types of construction in connection with the county engineers and commissioners of the various counties of the state.

The road school is filling an important place in the economical make up of West Virginia. No other educational movement in the state means more to the citizenship than a thorough and complete knowledge of the road problems confronting West Virginia. More than five million dollars are available for expenditure upon the public road at the present time and a like amount contemplated to be voted upon during the coming winter, emphasizes the importance of the engineers and commissioners as well as the other citizens of the state studying how to obtain the best result for the money expended.

The road school is free to every citizen who desires to attend. Any person expecting to attend should notify either the State Road Bureau or the University so that provisions can be made for their entertainment.

Why Young Men Want Good Roads.

The young man of today bears within his bosom the hope of tomorrow, and while the old man dreams dreams, the young man is inspired with action by visions of future accomplisments. The days of the daring pioneer, that once held attraction for the vision of the mind, are of the past, and the young man of today, while in no wise restricted or limited in opportunities, stands on the threshold of the dawning of a new era, a new development of ideas, and conditions must be met and in this light opportunities as great, or greater, than those that confronted the young man of 50 or 100 years ago. While we cannot dream of some daring act in the wild, unexplored forest or on a desolate and lonesome plain, accompanied and comforted only by the queen of his imagination, the chance of rehabilitating the unproductive and waste territory that lies around his present homestead, the possibilities of making the idle acres become fields of golden grain and orchards of luxuriant fruit, offer greater inducement, all things considered, than was possible for the young man of 50 years ago. But, to enjoy these opportunities to make the visions and dreams real, it will be necessary for him to have methods of transportation that will make possible the realization of his dreams.

The young man likes friends, he enjoys companions and appreciates a good appearance which is often impossible if he travels over bad roads. To keep himself appearing as he would like to be seen, imposes a very heavy tax upon him for clothing, for cleaning and pressing clothes, and shining shoes, if he drives a horse, repairing and cleaning of harness and buggy. This in many instances amounts to many times more than would be his proportion of the cost of a good road, which would save to him great percentage of this outlay.

The young man who is full of life believes in action and desires to move about quickly because in a new era he should ever strive to keep pace with the modern developments so as to make his life as efficient and productive as is possible. Improved roads will help him in despatching whatever line of business he undertakes. It will give him advantages in his courtships, because of the opportunity to mingle more freely with the young people of his and adjacent communities, by being able to come and go more quickly and to keep his engagements regardless of weather conditions Many young men have found it a task to meet their business and social engagements, owing to the impassable condition of the roads.

The young man wants good roads to make to him his life more pleasant, more productive. By good roads, his social sphere will be widened, his neighborhood horizon will be extended, because of the opportunities they will bring to him, to assist him in accomplishing

more in all avenues of life. Good roads will enable him to acquire a larger circle of friends through a broader acquaintance. If he lives within the city or town, they will help him to get in touch with the country and country life. If he lives on the farm they will enable him to enjoy all the advantages of the city with its attractions, as may suit his likes. Surely the young man for the sake of himself and all who are associated with him, wants good roads. He wants good roads on which to walk, to ride, to drive, to go automobiling, to truck or to haul. He wants good roads on which to visit, to do business, to seek the gentle hand, to meet his friends, to go to school, to church, to the store, to the place of amusement, to go to and from home when he pleases and with comfort.

He wants good roads to save his clothes, his team, his resources, his time and his temper.

Why Young Women Want Good Roads.

Every young woman has an appreciation for the beautiful and attractive sides of life. She sees attraction in the sun's rays, in the dew drops and in the flowers. She finds enjoyment in the sun rise, and is thrilled with ecstacy at the glowing sunset. She finds pleasure in a stroll by the babbling brook or in a drive beneath the shadows of the pale moon, provided the environments are to her liking.

Many young ladies, who have been born and reared on a farm become tired and grow weary of the seeming tasks and hardships brought about by the imprisoned conditions of the rural community owing to a lack of roads over which she may take such pleasant drive, to enjoy the handiwork of nature.

She reads in books and magazines of the opportunities and advantages that are offered in cities and other communities. So wide is the contract and so attractive the picture that she paints from the article, that the attractions of her homestead are shadowed by the brilliance of the picture her imagination portrays. Thus, she leaves the old fire side in pursuit of a new liberty, not a liberty from the home and its cares, not a liberty from parental control and its restrictions, but a liberty from the bonds of social ostracism, caused by the condition of the roads around her home. If she had a good road, opportunities for drives by automobile, or by horse and buggy, would be afforded her. She has friends who would offer her these opportunities, but the mud and stony road prohibits. She desires to visit with her neighbors, but cannot because of the muddy and impassable conditions of the roads. If she sees cause to make a visit the pleasure of her visit is marred, because of the humiliating condition in which she must appear. Surely the young woman wants good roads, she wants them for the sake of her home. She wants them for the sake of her brothers and sisters. She has sympathy for the tired and worn horses. She wants them for his sake. She has sympathy for her father and is often agitated by the temper he brings home in the evening after a day's toil over rugged and muddy roads. She admires an absolutely happy home, and appreciates the smiles of those with whom she is associated, but detests and abhors the frowns and complaints of the teamsters who come in tired, worn and fretted from conditions imposed by the bad roads.

She desires to go to church and to attend social gatherings and to mingle with other young people and for this reason as well as others stated the young woman appreciates and wants good roads.

Stokes county, N. C., commissioners are preparing plans and specifications for bridge across Town Fork Creek.

On the Boonesboro Pike.

Within a month there will be completed in Clark county perhaps one of the finest pieces of road work that has ever been undertaken in Central Kentucky. Nine miles of the Boonesboro pike, from the city limits to the Kentucky River, which since early in the spring has been undergoing a thorough rebuilding, will have been finished, making the finest road in the county and second to none in Kentucky.

The road is modern in every respect and has been reconstructed from the rough rock base to the top layer of the finest screening to be obtained from Kentucky limestone, all new and without a flaw to mark a point as an inferior piece of work on the entire highway from the beginning of the road one mile from the city to the river. That this is a most difficult piece of road work is shown by the long period which it took to reconstruct it. The wide winding turn and steep inclines as the highway nears the river, rendered it a difficult problems, but by the most modern methods the work has been accomplished and it is expected before the bad weather sets in the work will have been completed.

The contract for the construction of this long stretch of road was let late last winter to Mr. Brent Haggard, of Winchester, the veteran turnpike contractor, whose work on several roads in Clark county stand a monument to his competency and thorough knowledge of modern road building. Constructed of the hardest Kentucky limestone, the road will stand the water of years with but little repairs. The stone from which the road was built was quarried along the routes of the road and in some instances had to be hauled long distances as the work progressed along the highway.

It was the hope to have the road completed before the fall weather set in, but owing to unavoidable conditions in the early spring, which hampered the contractor in the work, making it necessary for an enforced lay off during the unseasonable weather, the construction was delayed fully a month. Now the large crew of workmen are within a short distance of the city, and, unless the cold weather interferes, the first of January will see it completed.

Mr. Haggard, the contractor, has been in the road building business for a number of years and during that time has worked a number of turnpikes in Clark county. Perhaps the largest contract he has had with the county was the reconstruction of the Ruckerville pike, a total of 13 miles, which was completed last year, and which is one of the finest roads in the county. The Boonesboro pike nearing completion, is becoming one of the most popular roads for travel, owing to the increasing favoritism shown for the Kentucky River, especially during the summer season, and with the full length rebuilt the coming summer will find its popularity increased especially among autoists, whose frequent visits heretofore have been very unpleasant owing to the rough condition of the highway. In addition to this Mr. Haggard has other contracts for road construction in the county which he will begin as soon as this is completed.

A special session of the Illinois legislature proposes to remedy the flaw that is keeping Cook county from spending the $2,000,000 good roads bonds already voted.

At a meeting in Marion, Indiana, last month to definitely decide on the completion of a link of the Hoosier-Dixie Highway over five thousand people were present.

Good Roads For Louisiana

State Will Meet Federal Aid For Good Roads With Cash in Hand

THE RELATION of the states and the Federal government in regard to the questions of national good roads is discussed at length by the New Orleans Picayune, in its editorial review of the recent meeting of the New Orleans Good Roads Association at Alexandria. The editor of the Picayune takes the position that the states must make an appeal for Federal aid with their part of the cash in hand. The Picayune editorial follows:

"The convention of the Louisiana Good Roads Association at Alexandria has given the friends of the cause an opportunity to discuss its various aspects and to decide upon the best policy to be pursued. The greatest popular interest is felt in the matter and the desire is universal to have better roads in Louisiana. All classes have shown their interest, and have even voted to tax themselves for this purpose. The popular interest and backing need no longer be discussed —the only point at stake just now is how to get the best results, to raise the money needed to construct the largest mileage and build roads that will be of the greatest service to all; whether the money shall come largely from the federal government by a big appropriation made for that purpose, from the state by means of a bond issue, or whether we should continue the plan adopted a few years ago whereby the revenue from the road tax and automobile licenses was used to encourage the parishes to build by assisting financially those which contributed to the cause, either by means of road taxes or the issuance of road bonds.

"The proposition for federal aid was, of course, approved, and the convention unanimously endorsed the proposition that Congress vote $25,000,000 for this purpose. The measure has already been presented in Congress and vigorously pressed, but it must be confessed that it has not so far made much headway, and that the prospects just at present, are not good for immediate action or for any large appropriation. Congress will, in time, recognize that the improvement of our highways is as important and as much an obligation of the federal government as the improvement of our interior waterways. In building roads we will be simply going back to practices that prevailed in the early days of the republic, when we recognized the necessity of public post-roads, connecting the several states and sections. Without these, it would have been impossible to settle up the country. The good roads of old days scattered settlements and colonies throughout the South and West.

"The indications are that there will be such heavy demands on the government at the coming session for a stronger navy, army and better defences that congress will not be in a position to vote much money for improvements and will not feel disposed to go into a new venture like road-building. As a matter of fact, one of its most difficult duties will be to provide more funds as the needs and expenses of the government are likely to run far beyond the usual budget. The friends of rivers and harbors have expressed some apprehension on the point—lest Congres will spend so much on "preparedness" that there will be little left for river improvement and none for good roads. Some, however, hope that Congress will show a liberal spirit in the matter of appropriations and will not limit that liberality to military preparations but will extend it to all improvements in which the people are direetly interested.

Different State Ideas.

"As to the matter of road building in the state and the expenditure of the money raised from direct taxation and auto licenses, amounting to slightly in excess of $200,000, a difference of opinion was shown in the convention as between the plan now in vogue whereby the state assists the parishes in the construction of good roads out of the state fund, the continuanee of which was advocated by the state highway engineer, and the issuance of $3,000,000 of bonds for the construction of three great trunk highways, the bonds to be guaranteed by the road tax revenues. This proposition has the backing of the oGod Roads Association and carried the convention. A committee will be appointed to wait upon the legislature at the next session and present the proposition and press its passage.

"The same question has been fought over elsewhere —shall state taxes be used for the construction of trunk lines which cannot, of course, be used by a majority of the parishes or shall they be spent in road building throughout Louisiana in such a way as to encourage the parishes to contribute more liberally to the cause. There are arguments on both sides of the case. It was originally intended to distribute the money among the parishes, as is done in most other states, the idea being to arouse greater interest in road building, for at the time the tax was proposed Louisiana stood almost at the bottom of the list in the matter of good roads as the United States Postal Department reported in explaining why it had so few rural delivery routes.

"On the other hand, the absurdity of building piecemeal roads, beginning nowhere and ending nowhere was appreciated by all, as well as the need for highways that would connect the leading sections of the state and link the several parish and other local roads. There has been some improvement since and several parishes and districts have voted money for road construction, but these contributions have not been as frequent or as large as in Texas or other southern states, and therefore it has not been possible to do as much as in northern states like New Jersey, New York and Massachusetts and several southern ones where the plan of state aid has proved so satisfactory and has brought about a systematic road plan.

"It would seem that the best results can be secured by a campaign in the several parishes to persuade all of them to vote money for the construction of highways. More liberality on their part that would give us more good roads, would show the popular interest in them, and the willingness of all to contribute to their construction would prove their great value and would best help the ease. If this were done it would render it a far easier matter to get favorable action from the legislature looking to a $3,000,000 good roads bond issue and would help the appeal to congress for an appropriation of $25,000,000 for highways.

"To secure federal and state assistance it is necessary to show that the people were willing to bear their share of the burden."

The Norfolk County, Va., road commissioners will repair several bridges under their supervision.

GOOD ROADS NOTES
GATHERED HERE and THERE

Georgia.

The following road statistics of Georgia for 1914, collected by the state geological survey in co-operation with the United States office of public roads and rural engineering, made public by State Geologist McCallie, at the meeting of the Georgia road commissioners in Atlanta:

	1911.	1914.	Percentage of increase
Total mileage of public roads	83,986	101,236	17.04
Sand-clay and top soil roads	.....	12,903	....
Macadam roads	.....	330	....
Chert roads	.....	523	....
Gravel roads	.....	410	....
Other roads surfaced	.....	635	....
Earth roads improved	.....	29,430	....
Earth roads unimproved	.....	39,460	....
Unclassified roads	.....	39,460	....
Commutation tax	659,002	663,353	0.66
Probable tax for roads and bridges	1,770,697	2,709,081	53.00
Automobile tax from secretary of state	.....	92,739	....
Number of convicts on roads	4,744	7,056	48.74
Average value of convict labor, each per day	1.00	1.00	25.00
Total value of convict labor per year	1,423,200	2,646,000	85.92
Total amount for road purposes	3,852,899	6,111,173	58.61
Average cost per mile of public roads	45.87	60.36	31.58
Average per inhabitant, 1910 census	1.48	2.34	58.10

Began collecting statistics last March.

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Illinois.

Indications are that at least thirty counties of Illinois will have adopted the Vermilion county plan of building state aid roads before the next legislature meets. Already ten counties have adopted the Vermilion plan. The Vermilion county plan is not an intricate one. The county pasesd a $1,500,000 bond issue. These bonds mature in twenty years. The money is available immediately for state aid work. Though the same amount is not available at the present time for the state's share of the road work, the state money can be added to the sum secured from the sale of these bonds as soon as it is available. In the meantime the county is going ahead building state roads as fast as the commission can get the plans ready. As a result Vermilion county will have many miles of hard roads before some of the other counties are fairly started.

During the next six weeks meetings will be held in every township in LaSalle county urging that this be done. The meetings are to be held to interest the farmers in the hard road movement. The board of supervisors at their December meeting will be asked to call a special election to vote on the issuance of the bonds amounting to $1,500,000.

Iowa.

Notwithstanding the fact that there are twenty-three states in the Union with a greater land area than Iowa, this state has a greater road area than any other except Missouri and Texas. Iowa has a total road mileage of 104,027, Missouri has 107,293, and Texas 128,971. Missouri has a total area of 69,415 square miles and Texas 265,780 square miles of country, while Iowa's area is 56,025 square miles.

Illinois has 94,141 miles of roads, and its area in square miles is 56,650. California has 48,069 miles of roads, while its land area is 158, 360 square miles.

The unusual amount of road mileage in Iowa is due to the fact that there are roads at practically every section line and in numerous localities every half section.

In 1914 Iowa spent more on her roads that any other state in the Union without a single exception. The cash road and bridge expenditure exclusive of state funds on public roads outside of incorporated cities, towns and villages in 1914 amounted to $11,363,000. California came next to Iowa last year in the amount spent on the country roads, with a grand total of $9,495,281. Indiana spent approximately $9,000,000. Ohio spent approximately $8,500,000. Texas, with her immense territory, spent $8,750,000.

Iowa has 2,505 miles of improved road out of her total of 104,027 miles of road. Ohio has 28,312 miles of improved road. Indiana 26,831. New York 22,398. Georgia 12,500, and Wisconsin 11,163.

Twenty-six states in the Union gave state aid to their roads last year, but Iowa is not in this list.

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Ohio.

The unprecedented success achieved by good roads workers in the recent Ohio elections will lead to an enlargement of the program for next year. In all save one, the special tax levies for road improvements carried by big votes, in some of the counties the majorities being larger than the negative vote. A little incident in connection with the election will serve to illustrate the change that has taken place in public sentiment with regard to road improvements. When the first special levy elections were held in 1913 the levies were generally defeated. In 1914 the result was not far from an even break despite vigorous canvassing. In those counties in which the levies were carried in 1914 the result was due to the vote of the city dwellers.

This year when returns were first given it was assumed that the country vote would cut down the city majorities. On the other hand, in every instance the city majorities were considerably increased when the country vote came in. The country districts have been converted to the special levies for road building and repair. The analysis of the returns makes it not improbable that next year the question of extra levies will be submitted to voters in many counties, perhaps 25 or 30. In counties in which the question was not submitted this year because of the fear that the vote would not be favorable, clamor has already been heard for submission. By next year completion of road improve-

ment organizations may extend the campaign to districts which are not covered this year.

One feature of the election that has escaped general attention is the fact that it has resulted in making available large sums for improvement in addition to the tax levies by the counties. The county funds will be supplemented by township funds and by special assessments, so that it is probable that instead of $4,000,000 for road improvement in the various counties the actual amount will be not far from $6,000,000.

The returns from tax levy elections in counties along the line indicate that the proposal to build a great highway from Cleveland through Columbus to Cincinnati by the shortest route has been very liberally supported, and that the residents along the way are giving encouragement.

Scores of letters have been received from the counties in which the special levies carried this year thanking the Ohio Good Roads Federation for its aid in the work. Already calls for similar assistance in other counties next year. Some of the counties want immediate help for organization.

* * *

Tennessee.

Several miles of the Memphis-to-Bristol highway has been completed by the contractors, from McEwen to the Dickson county line. This gives old Humphreys the first first-class highway ever in the county. D. H. Brown was the contractor. Quite a number of other contractors are pushing their work, with a large number of teams and men, and hope soon to have other roads completed. This highway east of Nashville will be open for travel in a short time. Cumberland county has sold $100,000 of road bonds and will be ready to proceed to fill in the broken links in this highway between Roane and White counties in December. White county began work on that section connecting Sparta with the Cumberland county line on Nov. 22. It is the desire of White county's citizens to see this road declared open for travel by the Memphis-to-Bristol highway commission in the early.

Bids for the construction of several roads in Knox county were received by the Knox county good roads commission Thursday, Nov. 18.

The total expenditures of the good roads commission to Nov. 10, aggregates $67,566.30.

Cross road, from McMillan's station to Tazewell road, 3-4 miles.

Dandridge road, from Mountain-View to Williams-Creek, one mile.

Island Home road, repair and build, three miles.

Maryville road, from Vestal to Maxey's, four miles.

Ford-Valley road from Pickens-Gap road to Sevierville road, two miles.

Millertown road, from Washington road to Bethlehem, three miles.

Sutherland avenue road, from L. & N. bridge to Kinston road, 3½ miles.

Solway road, from Norman's to Clinch River, three miles.

Lovell road, from Kinston road to Ball-Camp, five miles.

Dutch-Valley road, from Lovell road to Hood-Mabry road two miles.

Emory road, from Ledgerwood's school to Beaver Ridge road, seven miles.

Emory road, from Concord to Ebenezer, five miles.

Kingston road, from end of macadam to London county line, 3¼ miles.

Virginia.

President George P. Coleman, of the Virginia Road-Builders' Association, and C. B. Scott, of the State Highway Department, are going forward rapidly with arrangements for the fourth annual convention of the association to be held at Richmond in January. Public interest in road-building and road-improvement projects in Virginia is greater this year than ever before in the state's history, and reports from different parts of the Commonwealth indicate the largest gathering of good roads boomers at this convention Virginia has ever seen.

The sessions will be held in the assembly hall of Murphy's Hotel annex. The object of these conventions is to bring together city and county officials, highway engineers and citizens from all parts of Virginia who are interested in road construction and maintenance, with a view to having an interchange of ideas on all subjects pertaining to building new highways and improving those already constructed.

A further object is to bring these matters before the General Assembly in an intelligent manner so as to impress upon the lawmakers the importance of good-roads legislation.

Among the speakers who will discuss road building and maintenance in the convention next January are experts from several states, men of national reputation, who will deal with the various phases of good-roads work. Invitations have been extended to the boards of supervisors of all counties, the Mayors of cities and other public officers. The Mayors and supervisors are requested to name delegates to represent their respective cities and counties in the convention.

"The object in asking for delegations of private citizens from the counties and cities," Highway Commissioner Coleman explains, "is to give people not in official life in all parts of Virginia an opportunity to come to Richmond on this occasion and inform themselves by obtaining knowledge at first hand regarding what has been done already for the public highways of Virginia and what are the present needs of the state. The Virginia Road-Builders' Association and the State Highways Department will do everything in their power to encourage and assist the counties and cities in sending large delegations to Richmond next January."

Arrangements will be made with all the railroads in the state and all the hotels in Richmond whereby special reduced rates will be given to all who attend the sessions of the good-roads convention.

The Official Dixie Bee Line Route.

Beginning at Danville, Ill., the Bee Line runs east a short distance into Vermilion county, Ind., passes through Cayuga, Newport, Clinton and into Terre Haute. From Terre Haute it strikes Sullivan, Vincennes, Hazelton, Princeton and into the hub of the line at Evansville.

Crossing the river at Henderson the road continues south into Poole, Dixon, and to within two miles of Providence, Ky., where a swerve is made to the east striking Madisonville.

At this point a branch line continues east, going through Greenville to the Dixie Highway at Russellville, Ky.

The main line draws up beside the right-of-way of the L. & N. railroad and folows the Dixie Flyer south into Springfield, passing through Earlington, Nortonville, Mortons, Crofton, Hopkinsville, Pembroke, Trenton, and Guthrie, Ky., and Fort Mint Bed, Adams, Cedar Hill, Tenn., joining the Dixie highway again at Springfield.

A Revolution in Vacation Ideas

By F. W. WILSON

PRACTICALLY every family of even moderate means now owns at least one automobile. When time for the annual vacation comes, train schedules are not consulted as in the good old days when Dobbin was the Limited's principal competitor as a means of transportation to the promised land of rest and recreation. No sir, it's the Automobile Blue Book that the owner of the private touring car on vacation bent consults. And it's good roads and good routes he seeks.

The resort not accessible via a well-built, smooth highway is indeed unfortunate in this year of our Lord, 1915. It isn't sufficient to advertise that it can be reached by two lines of railroad and one fine boat line, because the autoist doesn't go vacationing very much nowadays in either of those ways. He wants to be his own engineer and his own conductor; he wants to decide for himself when to go slowly and when fast; when to stop and when to go. He wants to start at any hour or any minute that suits his convenience and demands the privilege of choosing his own companions to occupy the car with him.

This change, brought about by the widely increasing ownership of automobiles, has caused a nation-wide interest to be taken in the subject of good roads. It

Oiled Macadam Road Near Jeffries, N. H.

isn't only the auto owner that is boosting for them, but everybody directly or indirectly catering to or profiting by the travellers' patronage. And that covers a mighty broad field.

There's the hotel man and all his employes; all the merchants and farmers that serve him; all the employes of these merchants and farmers, and in turn the merchants with whom they spend their earnings. Follow the string out to its end and see for yourself what counties thousands of people have a direct or indirect interest in having good roads traverse their region.

There's many a natural beauty spot, in almost every state, that would attract autoists to it and bring a share of prosperity to the dwellers in the vicinity, if it could be reached via a good road.

The building of roads isn't the gigantic task it once was. Mighty dynamite levels the hills and fills the gullies, blows out the stumps and breaks the boulders and ledges. A few men working intelligently with the powerful explosive will grade miles where large crews with picks, shovels, sledges and axes used to grade rods. With labor costs thus reduced, many communities can now have good roads and their share of the tourist patronage that were denied the blessings a few years ago.

The handling and use of dynamite isn't the mystery it once was. Manufacturers, in order to increase the consumption of their product, have prepared books of instructions which are so explicit that the tyro soon becomes an expert blaster. The fear of the explosive is gradually disappearing also, due to large numbers of people seeing it freely and safely used in their midst.

Withal, everything seems to be working for the rapid expansion of the good roads movement. It is being realized everywhere that if you want the vacationist with the most money to spend, you must provide him a good road over which to roll his shekels into your coffers.

Gulf Cities Want Coast Roads.

Proposing to link all of the national trunk line tourist highways east of the Mississippi river, Mobile called the Old Spanish Trail convention to meet December 10 and 11. Mobile proposes to make this an epoch in the history of the eastern gulf coast by inauguration of the project to begin the first span of the southern route highway from the Atlantic to the Pacific coasts. It is proposed to the cities of Florida, Georgia, Alabama, Mississippi and Louisiana that they unite for the building of a highway that will belt the eastern gulf coast from Miami, Fla., to New Orleans, converging with the routes of the Dixie Highway and the Jackson Highway in Georgia, Florida, Alabama and Mississippi and constructing the connecting link of roadway needed from the convergence with the Dixie Highway in Georgia to the convergence with the Jackson Highway at Mobile.

Without this highway the homeseeking and tourist interests of the coastal South are split in a sharply defined line represented by the lack of roads and impossible river and bay crossings in southern Alabama and western Florida. With this highway the thousands of tourists who will follow the trunk line roads from the North can tour from one great highway route to the other around the gulf coast. This is an advantage not only for those tourists who are already certain to come South through the efforts made by the Blue Book to route travel southward, but for the whole coast, as it is stated by the officials of the Automobile Blue Book that such a route of standard highways would draw thousands more of the tourists, particularly during the winter season.

The Mississippi coast in particular has already promised strong support for the Jackson Highway and Old Spanish Trail and two big contracts have been let within the past few weeks for seawalls and highway work. Pascagoula is building a 5,000 foot seawall and has pledged itself to construct a bridge over the Pascagoula river and to construct a highway through all of the lowlands approaching the Alabama line. Thirty miles of concrete highway, equal to any in California, are planned on the coast through Biloxi to Bay St. Louis and enthusiastic endorsement of the Old Spanish Trail has been given.

Over Dixie Highway Next Year.

"We all live on the same street."

This is the slogan that has been adopted officially by the Dixie Highway association for the motor road that joins Chicago and Miami, a road that is more than a thoroughfare for automobile tourists. It is a bond between two peoples that were enemies only fifty years ago.

So enthused is Carl G. Fisher, the parent of the Dixie highway, over the results achieved on the recent trip of inspection that he is planning a similar trip a year hence, when all promised improvements will have been made and the Chicago-Miami pike will be ready for the motorist.

The 1916 tour will be a far more pretentious affair than the recent inspection trip and the start will be from Miami instead of Chicago, where the motorcade checked out for the 1800-mile migration of last month. As a special innovation Fisher hopes to interest Col. Charles Davidson, head of the Northwestern Military and Naval Academy, of Highland Park, in the run with a view of obtaining the armored war cars which were sent over the Lincoln highway to the Pacific coast this summer as a military escort.

Fisher favors a semi-military tour of the Dixie highway next fall and has requested Maj. Tyndall, an officer of the Indiana national guard, to take charge. Camping equipment will be carried on motor trucks, and at each night's stop tents will be pitched and dinner and breakfast will be eaten at a mess table instead of in the restaurants or hotels. A salute by rapid fire guns will announce the approach of the motorists, who will dress in khaki uniforms.

In addition to the battery of rapid fire guns there will be a battery of orators to bombard the residents of Florida, Georgia, Tennessee, Kentucky, Indiana and Illinois with good roads' forensics, and a quartet of vocalists to hurl ragtime bombs at the veterans who fought under Lee and Jackson a half century ago and their descendants.

Within the coming year the Dixie highway will be sign posted all the way from Chicago to Miami with the official marker, a blue bale of cotton with the words "Dixie Highway" stenciled upon it. Markers also will be set up at all county lines and at places of historic interest, so the motorist may read history as he runs.

At the present time approximately 900 of the 1,800 miles between Chicago and Miami are ready for automobile travel, but $11,000,000 in bonds has been voted for the improvement of the bad stretches, and in another twelve months the trip can be made in nine days. It took the members of the inspection partly double that time to travel from Chicago to the magic city of Florida.

As a result of the Dixie highway inspection tour the south is ablaze with good roads enthusiasm and the people living along the route are determined to make the road as near perfect as possible. In the Cumberland mountains, where the worst stretch of road was encountered, the Tennessee mountaineers have voted $350,000 to construct a new road to the top of the pine clad ridge. One county in northern Florida, with only 500 land owners, raised $150,000 to change a primitive trail of thirty miles through the sand into a macadam boulevard. There are 150 stone crushers and road making machines at work on the 180 mile Louisville-Nashville turnpike, a road with a telford base, which was laid by slaves more than eighty years ago.

"The Dixie highway is not open to automobiles at the present time.' Fisher said at the end of the inspection trip, "and it would be unwise to send motorists, especially women and children, over it now, but I am certain that within another year it will be in first class condition all the way from Chicago to Miami."

Lincoln Highway Pulling Ahead.

Having just observed its second anniversary, the Lincoln Highway—the 3384-mile transcontinental road dedicated to Abraham Lincoln—begins its third year with much construction work completed and with no signs of waning interest in the project. Figures prepared by the Lincoln Highway Association show that already there has been expended upon the road about $2,250,000, of which more than half has been spent the past year, and that improvements have been made in every state through which the highway passes. These improvements have included the building of permanent hard-surfaced roads, bridges, repairs to old roads and maintenance.

For all practical purposes the Lincoln Highway is completely marked from New York to San Francisco. At some points the marking is not as satisfactory as it might be, but this is being taken care of rapidly.

The entire length of the highway in New Jersey may be called perfect, every mile being hard surfaced. Pennsylvania has but nineteen miles of the road that are not hard surfaced, and has spent some $510,000 upon it in the last eighteen months. Ohio has spent over $350,000 on the highway in the past year, and $610,000 addition has been raised by the counties along the route. There are sixty-three miles of brick construction, more than in any other state.

Indiana has sixty-eight miles of concrete Lincoln Highway either built or assured by bond issue, $200,000 having been spent near South Bend alone. The gravel roadways through Illinois have been worked into fine shape and the counties traversed by the Lincoln Way are using some 400 barrels of cement in building seedling miles.

Iowa needs only legislative authority to begin constructing a hard surface on her section of the Lincoln Highway. The road is graded, crowned, drainaged and dragged entirely across the state, more than $125,000 has been spent in keeping it up during 1915. Five sections of concrete work are under way in Nebraska. The North Platte River has been bridged at a cost of $50,000, and permanent concrete bridges and culverts are rapidly replacing the old style wooden structures.

Wyoming has no hard surfaced portion of the highway, but has spent about $200,000 in maintenance on the route during the year. Sweetwater county alone, with 152 miles of Lincoln Highway and a population of but 12,000, has expended $100,000 on its upkeep. In Utah and Nevada over $75,000 has been spent and a vast amount of road work done voluntarily.

The Lincoln Highway in California is in practically boulevard condition, the perfect road adding the last necessary touch to the complete enjoyment of the transcontinental trip.

Figures as to the touring increase on the highways run from 25 per cent in the eastern states to as high as 500 per cent and 600 per cent at Western points. A constant flow of cross-county tourists have been motoring from one coast to the other during the past season.

The city council of Petersburg, Va., has authorized the expenditure of $50,000 on a good road to Hopewell, home of big munitions factories. The DuPont interests are expected in advance $50,000 to Prince George county.

Activity in Southwest Virginia.

The report submitted by Henry Roberts, of Bristol, chairman of the committee on progress to the recent meeting of the Appalachian Good Roads Association in Bluefield, deals with the volume of road work undertaken in the Southern Appalachian regions, and shows that upwards of $8,000,000 have been voted for road bonds since the former meeting of the association, and that several hundred miles of improved roads have been constructed.

In his report Chairman Roberts includes summaries of road work done in Western North Carolina, Eastern Kentucky and Southwest Virginia. Of the good work in Virginia he says:

"Construction work has been going forward in every county in Southwest Virginia with funds provided by previous bond issues and state aid, and in some instances by direct levies. Christiansburg district in Montgomery county voted $100,000 road bonds, out of which five and one-half miles of the old rock road—Bristol-Washington Highway—will be resurfaced.

"The gap in the Bristol-Washington Highway between Bristol and Abingdon, northern route, will be closed this fall except about one and one-half miles, which will be macadamized next year.

"Smyth county has resurfaced several miles of this highway, and will complete the resurfacing of the road entirely through the county next year, except some five miles next to the Wythe line.

"Russell county has graded the road from Hansonville to Bolton, and the section of the Bristol-Bluefield Highway from Hansonville to Cumbow, and now has a force of convicts grading and macadamizing the section next to the Tazewell line, and will complete same early next summer.

"Tazewell county has graded and macadamized a part of this highway in that county, leaving only a short section next to Russell to be macadamized, same having been recently graded.

"The work of President James F. Sutton and Vice-President L. D. Crawford (with some assistance of the chairman of this committee) in raising funds and grading and draining the Bristol-Coal Fields Highway across Clinch Mountain is to be especially commended. This six-mile section of mountain road has been put in splendid condition at a cost of over $5,000, of which nearly three-fourths has been raised by private subscription.

"Russell county has macadamized this highway from Castlewood to Dante, seven miles, and completed the macadam from Castlewood fifteen miles to Tumbez. President Sutton expects to raise funds this winter with which to build a $5,000 bridge at Mendota and grade and drain five and one-half miles to a connection with the Bristol-Lexington Highway by next fall, thus opening the Bristol-Coal Fields Highway from Bristol to Dante.

"The Bristol-Lexington Highway has been graded through Washington county, and is now being macadamized. Scott county has graded about twenty-five miles of same, and has about fifteen miles to provide for yet.

"Under the leadership of R. C. Duff and others, the old Boone trail across Powell Mountain from Duffield to the head of Wallens Creek, seven miles, is being graded, with an expenditure of more than $7,000, over half of which was raised by private subscription in that section. This will open the Bristol-Lexington Highway entirely through Lee county, some sixty miles, although ten miles through White Shoals District is rough, and they expect to vote bonds this winter to improve same."

Georgia Needs Commission.

With the selection of Macon for the 1916 convention of the Association of County Commissioners of Georgia and the adoption of resolutions calling upon the legislature of next summer to establish a state highway commission, a two days' discussion of good roads by Georgia commissioners and road engineers from many parts of the south came to a close November 17th.

Clark Howell, Georgia commissioner of the Dixie Highway association, emphasized the state-wide importance of good roads.

The county commissioners were unanimous in agreeing that a state highway commission should be created at the earliest time possible, in order "that there might be a more uniform system of road work and maintenance throughout the state, that the smaller counties may have the benefit of an expert engineer in the construction of their roads, together with data as to their construction and maintenance, and that the state of Georgia may align itself with the other states of the union so as to receive any benefits of government appropriation or government work through the proper medium."

This body, it was agreed, should be established on a non-political basis and its membership should serve with no compensation other than their expenses in connection with their official duties. They should, however, have power to employ expert assistance in carrying out their work of constructing a state-wide net of good roads. In this connection it was also suggested to the legislature that it "should not by any act or law, passed at this or any succeeding session, divert the funds arising from the automobile tax from the road working purposes to which it is now applied by law."

The legislative committee, upon which will fall the work of bringing such a bill for the highway commission to the attention of the legislature, will be composed of a county commissioner from each of the Georgia congressional divisions. The partial list which has been appointed follows: F. J. Frederick, third district; F. U. Garard, fourth; Dr. W. L. Gilbert fifth; Judge Moses Wright, seventh; E. E. Fields, ninth, and M. C. Holoy, tenth.

The officers of the county commissioners for the ensuing year are W. Tom Winn, re-elected president; W. J. Hedin, Cobb county, first vice president; Mallory, Macon, second vice president; S. B. Slack, faculty of University of Georgia, secretary, and Fred Houser, secretary of the Atlanta Convention bureau, treasurer. Manufacturer and Builder, the well known trade journal of Atlanta, was selected as the organization's official organ.

The News & Observer announces that Mr. Charles P. Eldridge, civil engineer in the employment of the State Highway Commission, has gone to the northwestern part of the state, and, beginning at Boone, he will make a tour of inspection of the public roads of Watauga, Ashe, and Alleghany counties, taking observations of directions, distances, roadbuilding materials and other matters looking to highway improvement. Several weeks will be occupied in making the tour. Mr. Eldridge is a son of Mr. and Mrs. T. B. Eldridge, and graduated from the A. and M. College last commencement.

Grainger county, Tenn., has recently voted $200,000 bonds for improved roads.

GOOD ROADS NOTES IN BRIEF

Oklahoma county, in which is located the state capital, Oklahoma City, is making ready to build twelve bridges.

A bridge over Neuse River has been authorized by the Lenoir county, N. C., commissioners. The estimated cost is $9485.

$200,000 recently voted by Knox county, Tenn., will be applied to the construction of waterbound macadam roads and concrete bridges.

Brazos county, Texas, has let the engineering contract for a system of roads in District No. 1, for which $400,000 is available for construction work.

The Maryland State Roads Commission has let contracts for road construction on stretches of highway in Wicomico, Caroline and Anne Arundel counties.

Washington county, Tenn., votes this month on a bond issue of $465,000 to construct roads.

Hopkins county, Texas, will vote soon on a bond issue of $400,000 to build eight macadam roads out from Sulphur Springs.

The Forsyth county, N. C., commissioners will build 2850 feet of concrete road on either side of Main street, Winston-Salem.

Sandy River district, McDowell county, W. Va., votes the 18th of this month on $293,000 bonds to con-

Palm Beach county, Fla., will build a road from West Palm Beach fifty-one miles across the Everglades struct good roads.
to the southern extremity of Lake Okeechobee.

Five wards in De Soto parish, La., contemplate voting on $280,000 bonds to construct gravel roads.

Baldwin county, Ala., votes January 18 on $225,000 bond issues for good roads.

Fulton county, Ga., commissioners will have survey of proposed $200,000 belt line road along Chattahoochee River.

Hillsborough county, Fla., contemplates voting on $400,000 bond issue to construct roads to connect with systems being built by adjoining counties.

An election will be held in Giles county, Tenn., December 20, on the question of issuing a half million dollar county good roads bonds.

The city of New Orleans plans to pave 34 miles of streets during 1916 at a cost of $1,334,465.

Alexander county, N. C., recently sold $150,000 worth of bonds for the construction of good roads. The work has already begun.

A great highway from Paris, Texas, to New Orleans is being agitated. The proposed road would cost seven million dollars, it is estimated.

Contracts for sixty-five miles of macadam roads have been awarded by Carter county, Tenn. Elizabethton, the county seat, is on the route of the proposed Boone Highway and a part of this 65 miles will will complete an important link in the road.

The city of Macon, Georgia, is spending all but $25,000 of a $300,000 bond issue in the construction of concrete street paving.

Greenville county, S. C., has several large road forces at work building $900,000 worth of good roads provided for in a bond issue this year. Part of this is being used on the Greenville-Asheville highway.

Baldwin county, Alabama, expects to spend a quarter million dollars on new roads during the coming year. Mr. J. M. Jarrett, of Montgomery, has been appointed county highway engineer.

The state supreme court of Illinois decided recently that the $2,000,000 bond issue in Cook county was invalid, because of considerable delay in issuing. They were voted by a big majority.

Sumter, S. C., has voted a quarter million dollars for improved streets.

Dayton county, Ohio, on November 2 voted by a good-sized majority to spend $460,000 on good roads during 1916 and 1917, $230,000 being available each year.

The work of building good roads all over McLennan county, Texas, has now been almost completed, with the construction of a total of 150 miles of permanent road. Over a million dollars has been spent within the last year and a half.

An effort to organize good roads associations in every county in Alabama is meeting with splendid success. Rev. J. W. Cary, state organizer, is bringing many converts to the side of progress.

A four months campaign for good roads in every one of the 75 counties in Arkansas is now in progress, under the auspices of the extension department of the University of Arkansas.

Kissimmee, Fla., has voted $70,000 bonds for street improvements, etc.

New Jefferson Highway Routed.

The routing of the Jefferson Highway by the meeting of that association in New Orleans last month brought on a strenuous fight. Arkansas lost to Oklahoma, the latter state winning this notable victory on its eight anniversary as a state.

The tentative route selected by the directory board of the Jefferson highway commission will be Winnipeg, Minneapolis, St. Paul, Des Moines, St. Joseph, Kansas City, Joplin, Muskogee, Denison, Shreveport, Alexandria, Baton Rouge and New Orleans.

The fight against Omaha was won by Des Moines after a somewhat turbulent session. Des Moines scored the first victory with the election of Lafayette Young, Sr., as permanent chairman. A permanent organization was effected with the election of E. T. Meredith as president and Harry H. Polk vice president. The board of directors of the Jefferson Highway association later selected a tentative route after an attempt by the Kansas delegation to force the route through Kansas.

The vice presidents are: Louisiana, L. E. Lyons, Jr.; Oklahoma, Dr. Oliver Bagby; Kansas, R. S. Tiernan; Nebraska, R. K. Brown; Missouri, J. M. Malang, and Iowa, H. H. Polk.

It is the intention of the directors to select a general manager who will assume the task of building the hard surfaced road which is to extend from Winnipeg to New Orleans. Following the decision of a route several thousand dollars were subscribed to the fund. E. T. Meredith and H. H. Polk each subscribed $1,000 and the directors subscribed $2,700. There were a number of $500 and $100 subscriptions and there were a large number for smaller amounts.

The next meeting will be held in Kansas City at the call of the president.

Colorado's Prairie Roads.

Colorado has 31,571 miles of public roads, according to a bulletin just issued by the department of agriculture at Washington. Only 2.1 per cent of the highways in the state are known as improved roads, the total number of miles of surfaced roads being 655. Other western states have improved roads as follows: Arizona, 400 miles; Wyoming, 450 miles; Nevada, 65 miles; Nebraska, 250 miles; Montana, 100 miles; Idaho, 611 miles; Oklahoma, 500 miles; New Mexico, 900 miles; Utah, 1,653 miles. But the roads of Colorado are naturally good, declares the Denver Post.

The percentage of Colorado's roads seems small and the total is small as compared with the 28,312 miles of improved highways in Ohio, or the 26,831 miles in Indiana. However, in the list of unimproved roads are included the thousands of miles of natural prairie roads in the state. On most of these thoughfares no work of any kind was ever done, the roads having been made on the prairies by the traffic. If these roads, many of which have no superior, were included in the list of improved roads, there would be a marked difference in the figures. More than 20,000 miles of the 31,571 miles of highways in the state are ordinarily classed as automobile roads.

Road conditions today show no change from yesterday, nearly all of the state highways being in normal condition. The Bear creek road, closed to permit blasting, is the only local highway which is not normal.

The only highways which are reported rough are the Kremmling-Steamboat Springs, Leadville-Wolcott, Cripple Creek-Canon City, Denver-Limon, Limon-Burdette.